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SMITHSONIAN DEPOSIT

THE

UNITED STATES

PATENT LAW.

INSTRUCTIONS

How to Obtain Letters Patent

FOR NEW INVENTIONS:

INCLUDING A VARIETY OF USEFUL INFORMATION CONCERNING THE RULES AND PRACTICE OF THE PATENT-OFFICE; HOW TO SELL PATENTS; HOW TO SECURE FOREIGN PATENTS; FORMS FOR ASSIGNMENTS AND LICENSES; TOGETHER WITH ENGRAVINGS AND DESCRIPTIONS OF THE CONDENSING STEAM-ENGINE, AND THE PRINCIPAL MECHANICAL MOVEMENTS, VALUABLE TABLES, CALCULATIONS, PROBLEMS, ETC., ETC.

BY

MUNN & CO., SOLICITORS OF PATENTS,
No. 37 Park Row, New-York.

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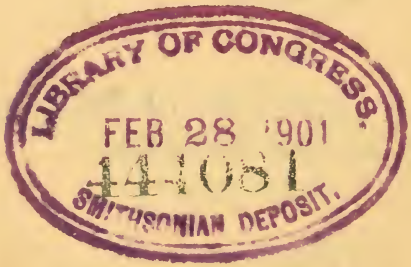

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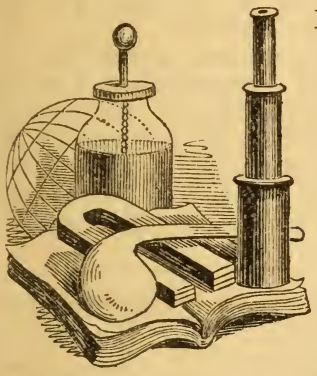
JOHN A. GRAY & GREEN,
PRINTERS,
16 AND 18 JACOB STREET, NEW-YORK.

HOW TO INVENT.



IF we were asked to point out the course of life, business, or enterprise upon which any man of ordinary gifts might enter, with the best prospects of speedy success, we should unhesitatingly direct him to *invention*. Many and wonderful have been the achievements of modern genius. But the realm of invention is absolutely exhaustless, and only its outer edges have been explored. The world has yet to witness the most astounding triumphs of mind over matter.

It is a popular error to suppose that much knowledge, painful effort, constant disappointment, and many wearisome failures are the necessary preliminaries to an inventor's success. True, there are individual examples of this kind; they are exceptions.

It may be affirmed as the general rule, that inventors make money more quickly, more easily, and with less expenditure of thought, capital, or labor, than any other class of men.

It may also be affirmed that industrial enterprises and speculations which are connected with the development and introduction of new inventions are among the most sure and *profitable* investments that can be made.

The readiest way to invent is to *keep thinking*. In order to supply the mind with a constant succession of subjects, the inventor should cultivate habits of *observation*. Keep your eyes and ears open. Examine things about you, and seek to know how they are made, and how improved.

The young inventor should acquire a knowledge of the general laws and principles of natural philosophy, chemistry, and all of the sciences.

Leisure hours might be occupied with drawing and with books suggestive of improvements. To avoid waste of time in reproducing old devices, the inventor should be well posted in regard to inventions that have already been patented. For this purpose, an attentive study of *The Scientific American* will be almost indispensable.

The Boston *Journal* makes the following useful remarks: "Of course, in order to succeed, a new invention must be superior to any thing that has preceded it, and must be sold at a price that will enable it to be brought into general use.

People cannot afford to throw away old implements unless the new ones are enough better to make up for the loss. Let inventors produce a good article, at a moderate price, and they will be sure of success."

SMALL INVENTIONS MOST PROFITABLE.

In an official report of a Chief Examiner of the United States Patent Office, we find the following: "A patent, if it is worth any thing, when properly managed, is worth and can easily be sold for from ten to fifty thousand dollars. These remarks only apply to patents of minor or ordinary value. They do not include such as the telegraph, the planing-machine, and the rubber patents, which are worth millions each. A few cases of the first kind will better illustrate my meaning.

"A man obtained a patent for a slight improvement in straw-cutters, took a model of his invention through the Western States, and after a tour of eight months, returned with forty thousand dollars in cash, or its equivalent.

"Another inventor obtained extension of a patent for a machine to thresh and clean grain, and sold it, in about fifteen months, for sixty thousand dollars. A third obtained a patent for a printer's ink, and refused fifty thousand dollars, and finally sold it for about sixty thousand dollars.

"These are ordinary cases of minor invention, embracing no very considerable inventive powers, and of which hundreds go out from the Patent Office every year. Experience shows that the most profitable patents are those which contain very little real invention, and are to a superficial observer of little value."

HOW TO OBTAIN PATENTS.

THE first inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them; they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

We (MUNN & Co.) have been actively engaged in the business of obtaining patents for about twenty years. Many thousands of inventors have had benefit from our counsels. More than one third of all patents granted are obtained by us.

Those who have made inventions and desire to consult with us, are cordially invited to do so. We shall be happy to see them in person at our office, or to advise them by letter or through THE SCIENTIFIC AMERICAN. In all cases they may expect from us an *honest opinion.* For such consultations, opinion, and advice, *we make no charge.* A pen-and-ink sketch and a description of the invention should be sent, together with stamps for return postage. Write plain; do not use pencil nor pale ink; be brief.

All business committed to our care, and all consultations, are kept by us *secret and strictly confidential.* Address MUNN & Co., 37 Park Row, New-York.

SPECIAL EXAMINATIONS.

FEE $5.

IN many cases it will be advisable, as a measure of prudence, to order a PRELIMINARY EXAMINATION. This consists of a *special search*, made at the U. S. Patent Office, Washington, through the medium of our house in that city, to ascertain whether, among all the thousands of patents and models there stored, any invention can be found which is similar in character to that of the applicant. On the completion of this special search we send a *written report* of the result to the party concerned, with suitable advice. Our charge for this service is $5.

If the device has been patented, the time and expense of constructing models, preparing documents, etc., will, in most cases, be saved by means of this search; if the invention has been in part patented, the applicant will be enabled to modify his claims and expectations accordingly.

Many other obvious advantages attend Preliminary Examination, although the strictest search does not always enable the applicant to know absolutely, whether a patent will be granted.

For example, applications for patents are sometimes rejected because the Examining Officer finds a description of the alleged invention in some foreign publication; or some other person has been previously rejected on an analogous device; or some other invention, for a similar purpose, partially resembles the applicant's in its construction; or the Government makes an unjust or uncommon decision. Against none of these contingencies does the Preliminary Examination provide.

It will, however, generally inform the applicant whether an improvement similar to his, and used for the same purpose, *has ever been patented in this country.*

Parties desiring the Preliminary Examination are requested to remit the fee, ($5,) and furnish us with a sketch or photograph, and a brief description of the invention.

Where examination is wanted upon more than one invention, $5 for each must be sent; as each device requires a separate, careful search. Address MUNN & Co., 37 Park Row, N. Y.

OTHER INFORMATION.

IF you wish for *general information* as to the rules and law of Infringements, Reïssues, Claims, etc., state your inquiries clearly, and remit $5. Opinions in special cases of Infringement cost more. See page 16.

If you wish for advice in regard to assignments, or upon the rights of parties under assignments, joint ownership in patents, contracts, or licenses, state the points clearly upon which information is wanted, and remit $5.

If you desire to know in whose name the title to a Patent is officially recorded, at Washington; or if you wish for an abstract of all the deeds of transfer connected with a Patent, send us the name of the patentee, date of patent, etc., and remit $5.

If you desire a sketch from the drawings of any Patent, and a description from the specification, give the patentee's name, date of the patent, and remit $5.

If you desire to have an assignment of a Patent, or any share thereof, or a license, made out in the proper manner, and placed on record, give us the full names of the parties, residences, title of the invention, etc., and remit $5. This includes record fee.

Inventions or shares thereof may be assigned either before or after the grant of a patent. Agreements and contracts in regard to inventions need to be recorded, like assignments, at Washington. For any agreement or contract that you wish prepared, remit $5.

☞ Remember that we (MUNN & Co.) have branch-offices in Washington, and have constant access to all the public records. We can therefore make for you *any kind of search*, or look up for you *any sort of information* in regard to Patents, or Inventions, or Applications for Patents, either pending or rejected, that you may desire.

CAVEATS.

The filing of a Caveat is oftentimes of great importance, as it may be quickly done, and affords a limited but *immediate protection.* The filing of a Caveat prevents, during its existence, the issue of a patent, without the knowledge of the Caveator, to any other person for a similar device. The Caveator is entitled to receive official notice, during a period of one year, of any other petition for a patent for a similar or interfering invention, filed during that time. On receiving such official notice, the Caveator is required to complete his own application within three months from the date of the notice.

A Caveat consists of a Specification, Drawing, Oath, and Petition. To be of any value, these papers should be carefully drawn up, and the official rules scrupulously complied with. No model is required. Our facilities enable us to prepare Caveat-papers with great dispatch.

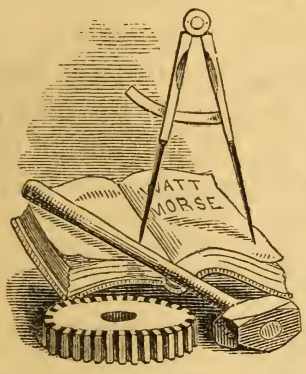
When specially desired, we can have them ready to send to the applicant, for signature and affidavit, by return mail, or at an hour's notice. The official fee for a Caveat is $10, and we generally charge $10 or $15 to prepare the accompanying papers and attend to the business—making $20 or $25 in all.

A Caveat runs for a year, and can be extended by paying $10 a year.

Caveats can only be filed by citizens of the United States, and aliens who have resided here one year and have declared their intention to become citizens.

To enable us to prepare Caveat papers, all that we need is a sketch, drawing, or photograph, and description of the invention, with which remit fees as above. Model not required.

PATENTS.



UNDER the present American law, all persons pay the same official fees, *without distinction as to nationality*. Patents are also granted to women and minors. The only discrimination is against inhabitants of countries that discriminate against inhabitants of the United States.

The first government fee on filing an application for a patent is $15; stamps, $1. Add to this the attorney's charge for drawings, specification, and attendance to the business of the case before the Patent Office. Our charge for these services is, for simple cases, $25; and from that price upward to $35 or more, according to the time and labor required. If the patent is "allowed," a second government fee of $20 is then to be paid.

RECAPITULATION OF COSTS.

First Government fee and stamps, - - - -	$16
Munn & Co., Specifications, Drawings, and Business,	25
*Cost of making the application, - - -	$41
Second Government fee, payable if allowed, - -	20
†Whole cost of Patent, (if a simple case,) -	$61

The application for a patent must be made in the name of the inventor, who alone can sign the papers. An attorney cannot sign the papers for the inventor.

Joint inventors are entitled to a joint patent.

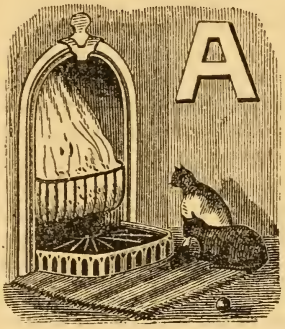
An agreement or partnership between two persons, one of whom is the inventor, and the other only a partner or part owner, does not make them joint applicants for a patent.

In case of the death of an inventor, his heirs may obtain a patent.

*If a patent is not granted, the applicant loses the cost of making the application.

†When an appeal is required there are additional expenses. See next page.

AMENDMENTS AND APPEALS.



We, Munn & Co., have an extensive Branch House in Washington, employing a corps of skilled assistants, and we make it our special duty to watch over the cases of our clients while they are before the Patent Office. If the examining officer objects to the grant of the claims, or gives references, or requires amendments, we examine the references, and make the amendments, if we deem them proper, so as to secure the allowance of our client's patent as soon as possible. When the examiner refuses to allow a patent, and rejects the case, we report the fact to our client, and inform him as to the probabilities of obtaining a reversal of the examiner's decision by an appeal to the Examiners-in-Chief.

First Appeal.—The government fee payable by the applicant on making an appeal to the Examiners-in-Chief, is $10. Our charges for preparing and conducting this appeal are very moderate, and generally contingent upon success.

Second Appeal.—From the decision of the Examiners-in-Chief an appeal may be taken to the Commissioner of Patents. Government fee, $20.

Third Appeal.—From the decision of the Commissioner of Patents an appeal may be taken to one of the Judges of the U. S. District Court at Washington. Government fee, $25.

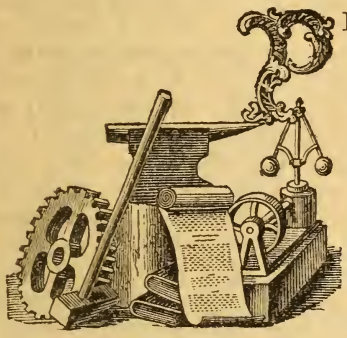
REJECTED CASES.

We shall be happy to take up REJECTED CASES, or to remodel defective papers for parties who have made application for themselves or through other agents. Terms moderate. Address Munn & Co., stating the particulars.

FORFEITED CASES.

By a recent change in the Patent Law, all inventors whose right to a patent has been forfeited by delay in the payment of the second Government fee, may now renew their rights by filing a new application. The original model may be used.

MODELS, REMITTANCES, ETC.



PERSONS who apply for patents are by law required to furnish a model, in all cases where the invention can be illustrated or partly illustrated by a model. The model must not exceed twelve inches in any of its dimensions; it should be neatly made, of hard wood or metal, or other substantial material; the name of the inventor should be engraved or painted upon it conspicuously. Where the invention consists of an improvement on some known machine, or part of a machine, a full working model of the whole will not be necessary. It should be sufficiently perfect, however, to show, with clearness, the nature and operation of the invention. More than one patent cannot be taken out on one model.

When the invention consists of a new article of manufacture or a new composition, samples of the article must be furnished.

New medicines or medical compounds, and useful mixtures of all kinds, are patentable. Samples must be furnished, and a very minute statement must be made of the exact proportions and ingredients used.

As soon as the model or specimen is ready, it should be carefully boxed and shipped, by express or otherwise, to our address, namely, MUNN & Co., No. 37 Park Row, New-York City. Prepay the expense, and send the express receipt to us by mail.

Simultaneously with the model or specimens, the inventor should also send us the first instalment of the Government fee and stamps, $16. The money may be forwarded either by express, with the model, or by mail. The safest way to remit is by draft on New-York, payable to our order, or by Post-Office order. Always send a letter with the model, and also with the remittance, stating the name and

address of the sender. We sometimes receive envelopes containing money, but without any name or explanation; models are also frequently sent us from equally unknown sources.

A full written description should also be sent with the model, embodying *all the ideas of the inventor respecting the operation and merits of the improvement.* This statement is often of assistance to us in preparing the specification.

On the reception of the model and Government fee, the case is duly registered upon our books, and the application proceeded with as fast as possible. When the documents are ready, we send them to the inventor by mail, for his examination, signature and affidavit, with a letter of instruction, etc. *Our fee for preparing the case is then due*, and will be called for. Immediately on its return, the case will be presented to the Patent Office, and as soon as the patent is allowed, the applicant will be notified to remit the last instalment of the Government fee, namely, $20, and the patent will then be issued.

Inventors who do business with us will be notified of the state of their application in the Patent Office, when it is possible for us to do so. We do not require the personal attendance of the inventor, unless the invention is one of great complication; the business can be done as well by correspondence.

The average time required to procure a patent is six weeks. We frequently get them through in less time; but in other cases, owing to delay on the part of the officials, the period is sometimes extended to two or three months, and even more. We make a special point to forward our cases *as rapidly as possible.*

Be neither lavish nor niggardly; of the two, avoid the latter. A mean man is universally despised, but public favor is a stepping-stone to preferment; therefore, generous feelings should be cultivated.

Never, under any circumstances, assume a responsibility you can avoid consistently with your duty to yourself and others.

QUICK APPLICATIONS.

When, from any reason, parties are desirous of applying for Patents or Caveats *in great haste*, without a moment's loss of time, they have only to write or telegraph us specially to that effect, and we will make special exertions. We can prepare and mail the necessary papers at less than an hour's notice, if required.

THE INVENTOR MUST APPLY FOR THE PATENT.

It is necessary, in all cases, that an application for a patent should be made in the name of the inventor, and the petition and specification must be signed by him. An inventor may appoint an attorney, or may sell and assign all his interest in an invention; still the patent papers, on making the application, must be signed and sworn by the inventor; otherwise they will not be received by the Commissioner of Patents. Canadians, and other foreign inventors, have erroneously supposed that by transferring their full rights to an American citizen, preliminary to an application, they could thereby obtain the patent for the same small fee required of a citizen. But this is impossible; for the applicant is required to swear that he believes himself to be the first inventor.

Remember that self-interest is more likely to warp your judgment than all other circumstances combined; therefore, look well to your duty when your interest is concerned.

Wine-drinking, chewing, and smoking are bad habits; they impair the mind and pocket, and lead to a waste of time.

PATENTS FOR DESIGNS, ETC.

DESIGN-PATENTS may be taken out for *any new form of any article*; also for new tools, patterns, ornamental castings of machine-frames, stove-plates, borders, fringes; all new designs for printing, weaving, or stamping upon silks, calicoes, carpets, oil-cloth prints, paper-hangings, and other articles. New forms for trade-marks, labels, envelopes, boxes and bottles for goods, may also be patented; likewise all works of art, including prints, paintings, busts, statues, bas-reliefs, or compositions in alto, or basso-relievo, new dies, impressions, ornaments to be placed or used upon any article of manufacture, architectural work, etc. [See page 76, section 11.]

The term for which Design-Patents are granted varies according to the fee paid by the applicant, as follows:

Patent for three and one-half years, $10; patent for seven years, $15; patent for fourteen years, $30. Add to the above the cost of preparing the specifications, etc., for which we usually charge $25.

No models for designs are required. But duplicate drawings must be furnished, together with the usual specification, petition, and affidavit, which, to render the patent of value, should be prepared with the utmost care. In many cases, two good photographs of the Design which it is desired to patent, may be used in lieu of drawings. The negative must accompany the photographs. Address,

MUNN & Co., 37 Park Row, New York City.

COPYRIGHTS.

COPYRIGHTS may be obtained for Trade-Marks, Labels, Stamps, Books, Drawings, Photographs, etc. The whole business of obtaining such copyrights is done by Munn & Co., 37 Park Row, for $5. Remit that sum, and send three *printed copies of the title* of whatever you desire to have secured.

GOING TO WASHINGTON IN PERSON.

Some inventors suppose, very naturally, that if personally present in Washington, they can get their cases through more expeditiously, or command other important facilities. But this is not so. The journey to Washington is usually a mere waste of time and money. A good agent must be employed after the inventor gets there. *No inventor can possibly have facilities or influence superior to our own;* more than one third of the entire business of the Patent Office passes through our hands; and we have an office in Washington, charged with the especial duty of watching over and pressing forward the interests of our clients.

The Patent Office does not prepare patent papers, or make models. These must be provided by the applicant or his attorney, according to law, *otherwise his claim will not be considered.*

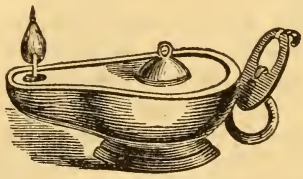
The law especially requires that all documents deposited in the Patent Office shall be correctly, legibly, and clearly written, and that the drawings shall be of a specified size, and executed in an artistic manner.

Persons who visit Washington in person, can have all their patent business *promptly attended to*, by calling at Munn & Co.'s Branch Scientific American Office, corner of 7th and F streets, opposite the Patent Office.

COPIES OF PATENTS, ASSIGNMENTS, ETC.

We furnish full copies of specifications or drawings of any existing patent, or open rejected case, official letter, assignment, etc., etc. The expense varies from $5 to $10 and over, according to the amount of work on the drawings. See page 7. For $1 we can send a copy of the *claims only*, of any existing patent.

INFRINGEMENTS.



THE general rule of law is, that the prior patentee is entitled to a broad interpretation of his claims. The scope of any patent is therefore governed by the inventions of prior date. To determine whether the use of a patent is an infringement of another, generally requires a most careful study of all analogous prior patents and rejected applications. An opinion based upon such study requires for its preparation much time and labor.

Having access to all the patents, models, public records, drawings, and other documents pertaining to the Patent Office, we are prepared to make examinations, and give opinions upon all infringement questions, advice as to the scope and ground covered by patents, and direct with vigor any legal proceedings therewith connected. Address, MUNN & Co., 37 Park Row, N. Y.

The expense of these examinations, with written opinion, varies from $25 to $100 or more, according to the labor involved. See page 7.

To the Editors of The Scientific American:

Let me encourage you, gentlemen, in your great enterprise. Perhaps we need light and elegant literature; we may even need "chess columns;" but let THE SCIENTIFIC AMERICAN continue to teach the people how to realize Dean Swift's prayer—"Make *two* blades of grass grow on the spot where only *one* grew before." Let it still increase the mechanical and agricultural knowledge of our artisans and farmers, by publishing the latest discoveries in science and improvements in the arts. And then its editors will have the noblest reward—that of being considered the guardian angels of genius, the champions of inventors, and the "prime motors" employed in developing the highest physical and intellectual resources of this great country.

Camden, Ark. W. A. SHAW, M.D.

GENERAL REMARKS.

OR over *twenty years* Messrs. MUNN & Co. have been personally familiar with the progress of invention and discovery. As an evidence of the confidence reposed in them, they may with propriety refer to the extraordinary fact that nearly TWENTY THOUSAND PATENTS have been obtained by them; and through their efficient Branch Office in Washington they have examined into the novelty of *many thousand inventions*, thus affording to them a knowledge of the contents of the Patent Office unrivalled by any existing agency.

Not only this, but a large majority of all the patents secured by American citizens in European countries are taken through MUNN & CO.'S AGENCIES IN LONDON, PARIS, BRUSSELS, BERLIN, AND VIENNA.

In addition to the advantages which the long experience and great success of our firm in obtaining patents present to inventors, they are informed that all inventions patented through our establishment are noticed, *at the proper time*, in THE SCIENTIFIC AMERICAN. This paper is read by more than one hundred thousand persons every week, and has the most extensive and influential circulation of all the journals of its kind in the world.

No individual in the country can possibly have so good an opportunity of knowing and judging as to the extent of business and the qualification of patent attorneys as the *Commissioner of Patents*. Judge MASON, upon retiring from the office of the Commissioner of Patents, sent us the following very flattering written testimonial:

COMMISSIONER MASON'S LETTER.

MESSRS. MUNN & CO.:

I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been FULLY DESERVED, as I have always observed, in all your intercourse with the office, a MARKED DEGREE of *promptness*, *skill*, and *fidelity* to the interests of your employers.

Yours, very truly, CHAS. MASON.

Judge MASON was succeeded by that eminent patriot and statesman, Hon. JOSEPH HOLT, whose administration of the Patent Office was so distinguished that he was appointed Postmaster-General of the U. S. Hon. Mr. HOLT was subsequently appointed Judge-Advocate-General. He addressed us the following very gratifying communication:

COMMISSIONER HOLT'S LETTER.

MESSRS. MUNN & CO.:

It affords me much pleasure to bear testimony to the *able and efficient manner* in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was VERY LARGE, and you sustained (and I doubt not justly deserved) the reputation of *energy*, MARKED ABILITY, and *uncompromising fidelity* in performing your professional engagements.

Very respectfully, your obedient servant, J. HOLT.

Hon. WM. D. BISHOP, late Member of Congress from Connecticut, succeeded Mr. HOLT as Commissioner of Patents. Upon resigning the office, he wrote to us as follows:

COMMISSIONER BISHOP'S LETTER.

MESSRS. MUNN & CO.:

It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very

large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as EMINENTLY QUALIFIED to perform the duties of Patent Attorneys with skill and accuracy.

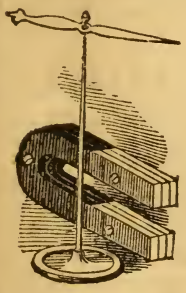
Very respectfully, your obedient servant,

WM. D. BISHOP.

One great reason for our unrivalled success is, that our affairs are so systematized and arranged under our personal direction, that every patent case submitted to our care receives the most careful study during its preparation, the most prompt dispatch, and the most thorough attention at every stage of its subsequent progress.

HOW TO CONVERT PAPER INTO GOLD.

SEND a subscription in paper money to Munn & Co., and enjoy a year's reading of THE SCIENTIFIC AMERICAN. Ten to one that the information thus obtained will result in bringing into your coffers, before the year is out, a hundred times more money in gold, than the original investment.



HE speed of an electric spark travelling over a copper wire, has been ascertained by Wheatstone to be two hundred and eighty-eight thousand miles in a second.

PARTIES sending models to the SCIENTIFIC AMERICAN office, on which they decide not to apply for Letters Patent, and which they wish preserved, will please to order them returned as early as possible. We cannot undertake to store such models, and if not called for within a reasonable time, we are obliged to destroy them, to make room for new arrivals.

EFFECTS OF HEAT UPON BODIES.

	Fahrenheit. Deg.		Fahrenheit Deg.
Cast-iron melts	2786	Cadmium	450
Gold "	2016	Tin melts	442
Copper "	1996	Tin and bismuth, equal parts, melts	283
Brass "	1900	Tin 3 parts, bismuth 5 parts,	
Silver "	1873	lead 2 parts, melt	212
Red heat visible by day,	1077	Sodium	190
Iron red hot in twilight,	884	Alcohol boils	174
Common fire,	790	Potassium	136
Zinc melts	773	Ether "	98
Iron, bright red in dark,	752	Human blood, (heat of,)	98
Mercury boils	630	Strong wines freeze	20
Lead melts	612	Brandy freezes	7
Linseed oil boils	600	Mercury freezes	—39½
Bismuth melts	497		

SOUND

is the effect produced upon the ear when air is set in motion within certain limits of rapidity. Audible sound begins when about thirty-two vibrations per second are made, and ceases when about 8000 vibrations per second are reached.

The number of vibrations corresponding with the middle C of a musical instrument is 522 per second. An octave below, half the number; an octave above, twice the number.

Sound travels at the rate of 1100 feet per second in a still atmosphere. The distance in feet between an observer and the point where a stroke of lightening falls, may be known by multiplying 1100 by the number of seconds that elapse after the flash is seen until the sound is heard.

A MESSIEURS LES INVENTEURS FRANCAIS.

Les inventeurs français non familiers avec la langue anglaise et qui préféreraient nous communiquer leurs inventions en français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessein et une description concise pour notre examen. Toutes communications seront reçues en confidence. Chaque personne, soit native ou etrangère, une seule exception, peut obtenir une patente dans les Etats Unis sous les mêmes conditions que les citoyens. On parle français dans nôtre bureau. Munn & Co.,

37 Park Row, New-York, Scientific American Office.

OFFICIAL

RULES AND DIRECTIONS

FOR

PROCEEDINGS IN THE PATENT OFFICE.

[THE following embrace the principal official rules under which the business at the Patent Office is now conducted.]

What will prevent the granting of a Patent.

Although an applicant may have actually made an invention, a patent therefor will not be granted him if the whole or any part of what he claims as new has been patented, or described in any printed publication in this or any foreign country, or been invented or discovered in this country; nor if he has once abandoned his invention to the public, or for more than two years consented and allowed it to be in public use or on sale.

The mere fact of prior invention or discovery abroad will not prevent the issue of the patent, unless the invention has been there patented, or described in some printed publication.

Merely conceiving the idea of an improvement or machine in this country is not such an "invention" or "discovery" as is above contemplated. The invention must have been reduced to a practical form, either by the construction of the machine itself or of a model thereof, or at least by making a full drawing of it, or in some other manner equally descriptive of its exact character, so that a mechanic would be enabled, from the description given, to construct a model thereof, before it will prevent a subsequent inventor from obtaining a patent.

The Specification.

Two or more distinct inventions may not be claimed under one application for letters patent. No positive rules for guidance can be laid down on this point; but in general, where there are several parts or elements of a machine, art, process, manufacture, or composition of matter, having no necessary or dependent connection with each other, and each susceptible of separate and distinct use or application, either by itself or in other connections, all set forth and claimed under one application for letters patent, the office requires the party to divide the application and confine the claim to whichever invention he may elect.

Where a principle of operation or construction is invented or discovered, the party is allowed to claim the principle broadly, and one mode of carrying it into operation.

The specification must be signed by the inventor, (or by his executor or administrator, if the inventor be dead.) It should describe the sections of the drawings, (where there are drawings,) and refer by letters and figures to the different parts.

The oath may be taken (in this country) before any person authorized by law to administer oaths.

The oath may be taken in a foreign country before any minister plenipotentiary, *chargé d'affaires*, consul, or commercial agent, holding commission under the government of the United States, or before any notary public of the country in which the oath is taken, being attested in all cases by the proper official seal of such notary.

Drawings.

The applicant for a patent is required by law to furnish duplicate drawings, where the nature of the case admits of drawings, the office reference copy of which must be signed by the applicant, and attested by two witnesses. These should be sent with the specification. The drawings must be neatly and artistically executed in fast colors, on one or more sheets separate from the specification, the size of the sheets to be twenty inches from top to bottom, and fifteen across, this being the size of the patent. One of these

drawings, to be kept in the office for reference, must be on thick drawing-paper, sufficiently stiff to support itself upright in the portfolios. Tracings upon cloth, pasted upon thick paper, will not be admitted. The other drawing, which is to be attached to the patent, must have a margin of one inch at least for that purpose on the right-hand side, and should be on tracing-muslin, which will bear folding and transportation, and not on paper. The drawings should generally be in perspective, with such detached sectional and plane views as to clearly show what is the invention, its construction and operation. All thick drawings should be colored and shaded, and when different materials are united in a machine, as steel and iron, or wood and metal, the distinction should be indicated by different colors on the drawings. Each part must be distinguished by the same number or letter, whenever that part is delineated in the drawings.

Applicants are advised to employ competent artists to make the drawings, which will be returned if not executed in conformity with these rules. Thick drawings should never be folded for transmission.

Of the Examination.

All cases in the Patent Office are arranged in classes, which are taken up for examination in regular rotation; those in the same class being examined and disposed of, as far as practicable, in the order in which the respective applications are completed. When, however, the applicant has a foreign patent for his invention, or when such invention is deemed of peculiar importance to some branch of the public service, and when, for that reason, the head of some department of the government specially requests immediate action, the case will be taken up out of its order. These, with applications for reïssues, are the only exceptions to the rule above stated in relation to the order of examination.

All amendments of the model, drawings, or specification must relate to the subject-matter originally embraced in at least one of them at the time of the filing of the application.

The personal attendance of the applicant at the Patent

Office is unnecessary. The business can be done by correspondence or by attorney.

When an application has been finally decided, the office will retain the original papers, furnishing the applicant copies—if he desires them—at the usual expense.

When a patent is granted, it will be transmitted to the patentee, or to his agent having a full power of attorney authorizing him to receive it.

Protests.

The Patent Office cannot stay the regular proceedings on applications for letters patent in consequence of protests founded upon *ex parte* statements, or upon affidavits from parties claiming to be aggrieved.

Retaining Patents in the Secret Archives.

An application upon which a patent has been allowed may, at the request of the applicant, or of his assignee, made before the patent has been recorded, be retained in the secret archives of the office for a period not exceeding six months from the date of the order to issue

Of Appeals.

After an application for a patent has been twice rejected by the examiner having it in charge, it may, at the option of the applicant, be brought before the board of examiners-in-chief.

For this purpose a petition in writing must be filed, signed by the party or his authorized agent or attorney, setting forth in general terms that the said applicant believes the rejection of his application to have been improper.

All cases which have been acted on by the board of examiners-in-chief may be brought before the Commissioner in person, upon a written request to that effect, and upon the payment of the fee required by law. A decision deliberately made and approved by one Commissioner will not be disturbed by his successor.

[The official fee for an appeal from the Examiners-in-Chief to the Commissioner in person, is $20. A further ap-

peal may be taken from the decision of the Commissioner to the U. S. Court of the District of Columbia. Official fee, $25. MUNN & Co. have had much successful experience in conducting these appeals. Charges moderate.]

The mode of appeal from the decision of the office to the Supreme Court of the District of Columbia is by giving written notice thereof to the Commissioner, filing in the Patent Office, within such time as the Commissioner shall appoint, reasons of appeal, and paying to him the sum of twenty-five dollars.

Of Interferences.

When each of two or more persons claims to be the first inventor of the same thing, an "interference" is declared between them, and a trial is had before the Commissioner. Nor does the fact that one of the parties has already obtained a patent prevent such an interference; for, although the Commissioner has no power to cancel a patent already issued, he may, if he finds that another person was the prior inventor, give him also a patent, and thus place them on an equal footing before the courts and the public.

When an application is found to conflict with a caveat, the caveator is allowed a period of three months within which to present an application, when an interference may be declared.

In cases of interference, patentees have the same remedies by appeal as applicants in pending applications.

In contested cases, whether of interference or of extension, parties may have access to the testimony on file, prior to the hearing, in presence of the officer in charge; or, when practicable, copies may be obtained by them at the usual charges.

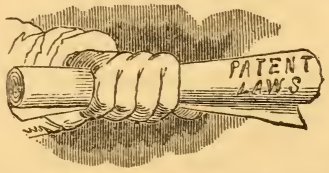
Upon the declaration of an interference, a day will be fixed for closing the testimony, and a further day fixed for the hearing of the cause. The arguments of counsel must be in the office on the day of hearing.

If either party wishes a postponement, either of the day for closing the testimony or of the day of hearing, he must, before the day he thus seeks to postpone is past, show by affidavit a sufficient reason for such postponement.

When an interference has been declared between two or more parties, and testimony has been taken by either of them, it will not be dissolved to admit a subsequent applicant; but when an interference is pending, and a new application claiming the invention in controversy comes into the Office before any ruling shall have been taken, the interference will be dissolved and a new one declared, which shall embrace all the claimants to the same invention.

[The management of Interferences is one of the most important duties in connection with Patent Office business. Our terms for attention to Interferences are moderate, and dependent upon the time required. Address all letters to MUNN & Co., No. 37 Park Row, New-York.]

Of Reïssues.



A reïssue is granted to the original patentee, his heirs, or the assignees of the entire interest, when by reason of an insufficient or defective specification the original patent is invalid, provided the error has arisen from inadvertence, accident, or mistake, without any fraudulent or deceptive intention.

An assignee or assignees making application for a reissue must own the entire interest in the patent, and must specify the date of the assignment.

The general rule is, that whatever is really embraced in the original invention, and so described or shown that it might have been embraced in the original patent, may be the subject of a reïssue.

Reïssued patents expire at the same time that the original patent would have done. For this reason, applications for reïssue will be acted upon immediately after they are completed.

A patentee may, at his option, have in his reïssue a separate patent for each distinct part of the invention comprehended in his original application, by paying the required fee in each case, and complying with the other requirements of the law, as in original applications.

Each division of a reïssue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part or parts.

One or more divisions of a reïssue may be granted, though other divisions shall have been postponed or rejected.

In all cases of applications for reïssues, the original claim is subject to reëxamination, and may be revised and restricted in the same manner as in original applications.

But in all such cases, after the action of the Patent Office has been made known to the applicant, if he prefers the patent originally granted to that which will be allowed by the decision of the Office, he has the privilege of abandoning the latter and retaining the old patent.

[The documents required for a Reïssue are a Statement, Petition, Oath, Specification, Drawings. The official fee is $30. Our charge, in simple cases, is $25 for preparing and attending to the case. Total ordinary expense, $55. Reissues may be applied for by the owners of the patent.

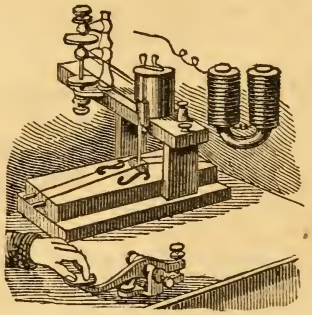
By means of Reïssue, a patent may sometimes be divided into several separate patents. Many of the most valuable patents have been several times reïssued and subdivided. Where a patent is infringed and the claims are doubtful or defective, it is common to apply for a Reïssue with new claims which shall specially meet the infringers.

On making application for Reïssue, the old or original patent must be surrendered to the Patent Office, in order that a new patent may be issued in its place. If the original patent has been lost, a certified copy of the patent must be furnished, with affidavit as to the loss. To enable us to prepare a Reïssue, the applicant should send to us the original patent, remit as stated, and give a clear statement of the points which he wishes to have corrected. We can then immediately proceed with the case. Address MUNN & Co., 37 Park Row, New-York. We have had great experience in obtaining Reïssues.]

Of Disclaimers.

Where, by inadvertence, accident, or mistake, the original patent is too broad, a disclaimer may be filed either by the original patentee or by any of his assignees.

Of Extensions.



The applicant for an extension must file his petition and pay in the requisite fee at least ninety days prior to the expiration of his patent. There is no power in the Patent Office to renew a patent after it has once expired.

The questions which arise on each application for an extension are:

1. Is the invention *novel?*
2. Is it *useful?*
3. Is it *valuable* and *important* to the public?
4. Has the inventor been *adequately remunerated* for his time and expense in originating and perfecting it?
5. Has he used due diligence in introducing his invention into general use?

The first two questions will be determined upon the result of an examination in the Patent Office; as will also the third, to some extent.

To enable the Commissioner to come to a correct conclusion in regard to the third point of inquiry, the applicant should, if possible, procure the testimony of persons disinterested in the invention, which testimony should be taken under oath.

In regard to the fourth and fifth points of inquiry, in addition to his own oath showing his receipts and expenditures on account of the invention, by which its value is to be ascertained, the applicant should show, by the testimony of witnesses on oath, that he has taken all reasonable measures to introduce his invention into general use; and that, without default or neglect on his part, he has failed to obtain from the use and sale of the invention a reasonable remuneration for the time, ingenuity, and expense bestowed on the same, and the introduction thereof into use.

In case of opposition by any person to the extension of a patent, both parties may take testimony, each giving rea-

sonable notice to the other of the time and place of taking said testimony, which shall be taken according to the rules prescribed by the Commissioner of Patents in cases of interference.

All arguments submitted must be in writing.

[NOTE.—Only patents issued prior to March 4, 1861, can be extended.

Many valuable patents are annually expiring which might readily be extended, and, if extended, might prove the source of wealth to their fortunate possessors.

All the documents connected with extensions require to be carefully drawn up and attended to, as any failure, discrepancy, or untruth in the proceedings or papers is liable to defeat the application.

In case of the decease of the inventor, his administrator may apply for and receive the extension; but no extension can be applied for or granted to an assignee of an inventor. Parties desiring extensions will address MUNN & Co., 37 Park Row, N. Y.]

Of Foreign Patents.

The taking out of a patent in a foreign country does not prejudice a patent previously obtained here; nor does it prevent obtaining a patent here subsequently.

When the patent is granted here, after being obtained abroad, it will extend only seventeen years from the date of the foreign patent.

Of Assignments and Grants.

The assignee of any invention may have the patent issue to him directly; but this is held to apply only to assignees of entire interests.

Although when the inventor assigns his *entire* interest to two or more, a patent will issue to them jointly, still, if he yet retain a portion in himself, a joint patent will not be issued to him and them; the inventor, however, may make himself an assignee of a part interest of his invention.

An inventor can assign his entire right before a patent is obtained, so as to enable the assignee to take out a patent in his own name; but the assignment must first be recorded and the specification sworn to by the inventor.

After a patent is obtained, the patentee may grant the right to make or use the thing patented in any specified portion of the United States.

Every assignment or grant should be recorded within three months from its date; but if recorded after that time, it will protect the assignee or grantee against any one purchasing after the assignment or grant is placed on record.

When the patent is to issue in the name of the assignee, the entire correspondence should be in his name.

The receipt of assignments is not generally acknowledged by the office. They will be recorded in their turn within a few days after their reception, and then transmitted to persons entitled to them. A five-cent stamp, cancelled, is required on every assignment, and on every oath and every certificate attached thereto.

Form of Assignment of the entire Interest in Letters Patent before obtaining the same, and to be recorded preparatory thereto.

Whereas I, Jethro Wood, of Scipio, in the county of Cayuga, and State of New-York, have invented certain new and useful improvements in ploughs, for which I am about to make application for letters patent of the United States; and whereas David Peacock, of Burlington, New-Jersey, has agreed to purchase from me all the right, title, and interest which I have, or may have, in and to the said invention, in consequence of the grant of letters patent therefor, and has paid to me, the said Wood, the sum of five thousand dollars, the receipt of which is hereby acknowledged: Now this indenture witnesseth, that, for and in consideration of the said sum to me paid, I have assigned and transferred, and do hereby assign and transfer, to the said David Peacock, the full and exclusive right to all the improvements made by me, as fully set forth and described in the specification which I have prepared and executed preparatory to the obtaining of letters patent therefor. And I do hereby authorize and request the Commissioner of Patents to issue the said letters patent to the said David Peacock, as the assignee of my whole right and title thereto, for the

sole use and behoof of the said David Peacock and his legal representatives.

In testimony whereof, I have hereunto set my hand and affixed my seal this 16th day of February, 1856.

JETHRO WOOD. [SEAL.]

Sealed and delivered in presence of—
GEORGE CLYMER,
DAVID RITTENHOUSE.

Form of a Grant of a Partial Right in a Patent.

Whereas I, Jethro Wood, of Scipio, in the county of Cayuga, and State of New-York, did obtain letters patent of the United States for certain improvements in ploughs, which letters patent bear date the 1st day of March, 1855; and whereas David Peacock, of Burlington, New-Jersey, is desirous of acquiring an interest therein: Now this indenture witnesseth, that for and in consideration of the sum of two thousand dollars, to me in hand paid, the receipt of which is hereby acknowledged, I have granted, sold, and set over, and do hereby grant, sell, and set over, unto the said David Peacock, all the right, title, and interest which I have in the said invention, as secured to me by said letters patent, for, to, and in the several States of New-York, New-Jersey, and Pennsylvania, and in no other place or places; the same to be held and enjoyed by the said David Peacock, for his own use and behoof, and for the use and behoof of his legal representatives, to the full end of the term for which said letters patent are granted, (if it is intended to grant for any extended term, then add—and for the term of any extension thereof,) as fully and entirely as the same would have been held and enjoyed by me had this grant and sale not been made.

In testimony whereof, I hereunto set my hand and affix my seal this sixteenth day of February, 1856.

JETHRO WOOD. [SEAL.]

Sealed and delivered in presence of—
JACOB PERKINS,
BENJAMIN FRANKLIN.

[Records of the title or ownership in patents are kept at Washington. Persons who wish to have searches made should address MUNN & Co., 37 Park Row. See "Other Information," page 7.]

Stamps.

Revenue stamps must be attached as follows:

A stamp of the value of *fifty cents* is required upon each power of attorney authorizing an attorney or agent to transact business with this office relative to an application for a patent.

No assignment directing a patent to issue to an assignee or assignees will be recognized by the Patent Office unless every sheet or piece of paper upon which such an assignment shall be written shall have affixed thereto a stamp of the value of *five cents*.

A stamp of the value of five cents is required upon each certificate of a magistrate.

Rules of Correspondence.

All correspondence must be in the name of the Commissioner of Patents; and all letters and other communications intended for the office must be addressed to him. If addressed to any of the other officers, they will not be noticed, unless it should be seen that the mistake was owing to inadvertence. A separate letter should in every case be written in relation to each distinct subject of inquiry or application, the subject of the invention and the date of filing being always carefully noted.

When an agent has filed his power of attorney, duly executed, the correspondence will, in ordinary cases, be held with him only. A double correspondence with him and his principal, if generally allowed, would largely enhance the labor of the office. For the same reason, the assignee of the entire interest in an invention is alone entitled to hold correspondence with the Office, to the exclusion of the inventor. If the principal becomes dissatisfied, he must revoke his power of attorney, and notify the Office, which will then communicate with him.

Of the Filing and Preservation of Papers.

All claims and specifications filed in the office (including amendments) must be written in a fair, legible hand, without interlineations or erasures, except such as are clearly stated in a marginal or foot-note written on the same sheet of paper; or, failing in which, the office may require them to be printed.

All papers filed in the office will be regarded as permanent records of the office, and must never, on any account, be changed, further than to correct mere clerical mistakes.

Of giving or withholding Information.

Aside from the caveats, which are required by law to be kept secret, all pending applications are, as far as practicable, preserved in like secrecy. No information will therefore be given those inquiring whether any particular case is before the office, or whether any particular person has applied for a patent.

But if a party whose application has been rejected allows the matter to rest for two years without taking any further steps therein, he will be regarded as having abandoned his application, so far at least that it will no longer be protected by any rule of secrecy. The specification, drawings, and model will then be subject to inspection in the same manner as those of patented or withdrawn applications.

Information in relation to pending cases is given so far as it becomes necessary in conducting the business of the Office, but no further. Thus, when an interference is declared between two pending applications, each of the contestants is entitled to a knowledge of so much of his antagonist's case as to enable him to conduct his own understandingly.

Where the rejection of an application is founded upon another case previously rejected, but not withdrawn or abandoned, the rejected applicant will be furnished with all information in relation to the previously rejected case which is necessary for the proper understanding and management of his own.

When an applicant claims a certain device, and the same device is found *described* but not *claimed* in another pending application which was previously filed, information of the

filing of such second application is always given to the prior applicant, with a suggestion that if he desires to claim a patent for that device, he should forthwith modify his specification accordingly.

But where the application, which thus describes a device without claiming it, is subsequent in date to that wherein such device is claimed, the general rule is, that no notice of the claim in the previous application is given to the subsequent applicant. But where there are any special reasons to doubt whether the prior applicant is really the inventor of the device claimed, or where there are any other peculiar and sufficient reasons for departing from the rule above stated, the Office reserves to itself the right of so doing without its being regarded as a departure from the established rule.

The Office cannot respond to inquiries as to the novelty of an alleged invention, in advance of an application for a patent, nor to inquiries founded upon brief and imperfect descriptions propounded with a view of ascertaining whether such alleged improvements have been patented, and if so, to whom; nor can it act as an expounder of the patent law, nor as counsellor for individuals.

☞ The reader will bear in mind that the foregoing are the official rules for doing business at the Patent Office.

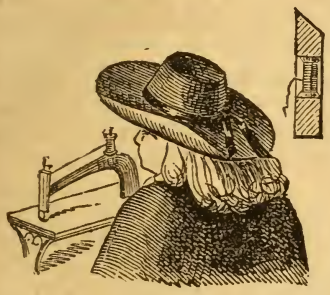
Inquiries as to the novelty of inventions may be addressed to MUNN & Co., 37 Park Row, N. Y. See pages 5 and 6.

Base all your actions upon a principle of right; preserve your integrity of character, and in doing this never reckon on the cost.

THE world estimates men by their success in life, and, by general consent, success is evidence of superiority.

Arsenic volatilizes before it fuses, and antimony melts a little below redness. Professor Draper thinks he has shown that all substances become red at the same point—1006 degrees Fahrenheit.

MODELS.



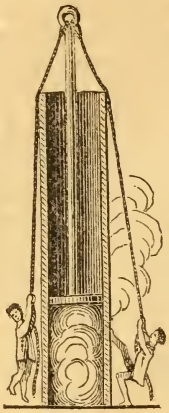
It is always better for inventors to have their models constructed under their own supervision, even at an increased cost in money or time. During the making of the model, the inventor often perceives points where important changes can be made, or where the invention may be rendered more perfect than was at first contemplated. But in some instances, owing to residence in distant parts or other causes, it is impossible for the inventor to furnish a model. In such cases, we (Munn & Co.) can have proper models built by experienced and trusty makers, at moderate charges.

TRACING PAPER.

Open a quire of double crown tissue-paper, and brush the first sheet with a mixture of mastic varnish and oil of turpentine, equal parts; proceed with each sheet similarly, and dry them on lines by hanging them up singly. As the process goes on, the under sheets absorb a portion of the varnish, and require less than if single sheets were brushed separately. The inventor of this varnish for tracing-paper received a medal and premium from the Royal Society. It leaves the paper quite light and transparent, it may readily be written on, and drawings traced with a pen are permanently visible. Used by learners to draw out lines. The paper is placed on the drawing, which is clearly seen, and an outline is made, taking care to hold the tracing-paper steady. In this way, elaborate drawings are easily copied.

Alcohol has more than double the expansive force of water of the same temperature. The steam of alcohol at 174° is equal to that of water at 212°. When proper means can be invented for saving the fluid from being lost, it is supposed that alcohol can be employed with advantage as the moving power for engines.

VOICE OF THE PEOPLE.



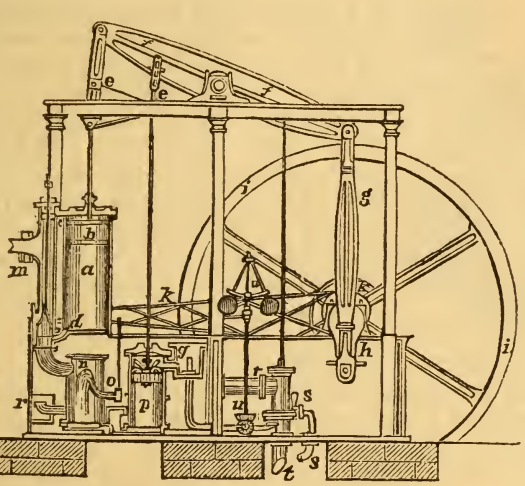
We might fill several volumes with flattering testimonials from all parts of the world, certifying to the great value of The Scientific American, but the limits of this little book only permit us to make a few selections. Read the following:

Messrs. Editors: Since I had the pleasure of receiving the back numbers of your interesting and instructive journal, I have shown specimens to several influential manufacturers and intelligent mechanics in this vicinity. One man told me that he had *twice* obtained five dollars for *a single recipe* that he copied out of The Scientific American, which he has taken regularly for several years; and I presume this is not an isolated case, by many hundreds. It is just such journals as yours that are annually condensed into encyclopedias, the compilers of which roughly scoop off the cream of all the new discoveries in science and art that have been recorded in the columns of various periodicals during the year; but the facts set forth in such annual works are often so mutilated or distorted in the condensation, and so meagre in outline, as to be practically of no value. Every mechanic and farmer in the land should subscribe for The Scientific American, not only for his own benefit, but also that of his children; he may have a Franklin or a Fulton, a West or a Watt, in that little marble-player whom he pets in his leisure hours; and the natural bias of the child's mind toward mechanical or agricultural pursuits requires to be confirmed or further developed by intellectual nourishment of such a quality and quantity as can be derived only from a journal like your own.

Never make money at the expense of your reputation.
Say but little—think much and do more.
Avoid borrowing and lending.

THE STEAM-ENGINE.

EVERY mechanic and inventor should make himself generally familiar with the construction and operation of the steam-engine. To assist them in gaining this knowledge, we subjoin for reference a diagram of the common Condensing Engine, with letters of reference to the names of the various parts:



a, steam cylinder; *b*, piston; *c*, upper steam port or passage; *d*, lower steam port; *e e*, parallel motion; *f f*, beam; *g*, connecting rod; *h*, crank; *i i*, fly-wheel; *k k*, eccentric and its rod for working the steam-valve; *l*, steam-valve and casing; *m*, throttle-valve; *n*, condenser; *o*, injection-cock; *p*, air-pump; *q*, hot well; *r*, shifting-valve to create vacuum in condenser previous to starting the engine; *s*, feed-pump to supply boilers; *t*, cold-water pump to supply condenser; *u*, governor. A study of the above diagram and description, in connection with attentive observation of engines in motion, will be of much assistance in acquiring a general understanding of the machine. We recommend the follow-

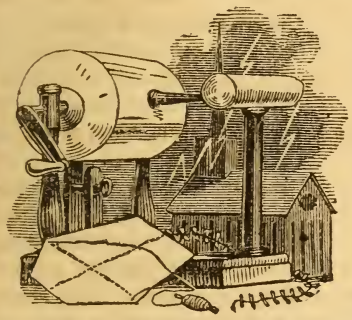
ing standard works for careful study by all who desire to become thoroughly posted: Bourne's Catechism of the Steam-Engine, Main & Brown's Marine Steam-Engine.

[From The Scientific American.]

A HINT TO LETTER-WRITING BORES.

E consider, as a general thing, that our correspondents are a fair and high-minded set of men, such as we are most happy to accommodate by answering, so far as it is in our power, all their inquiries; but there are a few of whom we can very justly complain. They put to us all sorts of questions, to answer which might require a half-day of our valuable time; and if we snub them off with a short answer, they are likely to reply back in complaining terms. It cannot be reasonably expected of us, that we shall spend our time in such—to us—profitless letter-writing. We mean to be accommodating, but cannot consent to waste all our time in getting information for correspondents who seem not to know how to appreciate either our forbearance or the value of our time. As an example of what we mean, we have a case before us. A correspondent wants us to hunt through our files for a notice of some book which appeared in The Scientific American some years ago, and to help him to find the book. He also wants us to find for him an English book which we do not believe can be had in this market. Another correspondent wants us to send to England without delay to get something which would require time and money to procure for him, but in regard to which he don't even inclose a three-cent stamp to pre-pay our letter. Another incloses three cents, and wants a calculation made which would cost us two hours' hard study. It is well enough for such correspondents to know that our time is worth to us more than a cent and a half per hour. Treat us fairly, and you will have no cause of complaint.

VOICE OF THE PRESS.



In examining the pages of our journal, we find them so covered with brilliant gems of commendation that it is difficult to select one which is more sparkling than another. We therefore take the following at random:

"The distinction achieved by the world-renowned firm of Munn & Co., as Solicitors of Patents, is alike *deserved* and commanding—deserved, because they have spared no effort nor expense since they entered upon their responsible vocation—commanding, because it is a distinction supported and upheld by all the scientific appliances within the reach of modern enterprise, and carries along with it a *prestige* which we in vain look for in the history of any similar firm. To the scores of inventors who are to be met with in this State—and especially to those among them whose diffidence may have hitherto restrained them from giving their discoveries to the world—we would say, by all means consult the firm of Messrs. Munn & Co., 37 Park Row, New-York, confident, as we feel, that by so doing (should your inventions possess merit) you will not only put yourself in the way of securing a patent for the same, but at the same time reap the satisfaction of knowing that you have committed your claims to hands emphatically qualified successfully to carry them out. We have deemed it a *duty*, in this mode, to 'say our say' in regard to an Agency which, while, we trust, it has been able to make its highly important business *pay*, has, at the same time, nobly upheld the true principles of scientific investigation, scorning to make the latter in the least degree subservient to merely pecuniary considerations."—*Rahway (N. J.) Times and Register.*

A CUBIC foot of air weighs 523 grains—a little more than an ounce. A cubic foot of water weighs 1000 ounces.

FOREIGN PATENTS.

AMERICAN INVENTORS should bear in mind that, as a general rule, any invention which is valuable to the patentee in this country, is worth equally as much in England and some other foreign countries. Four patents—American, English, French, and Belgian—will secure an inventor exclusive monopoly to his discovery among *one hundred millions* of the most intelligent people in the world. The facilities of business and steam communication are such, that patents can be obtained abroad by our citizens almost as easily as at home.

Models are not required in any European country, but the utmost care and experience is necessary in the preparation of the specifications and drawings. A variety of small tax duties and other fees must be paid; many official formalities are also to be observed in obtaining foreign patents. It is therefore important that the applicant should place his business in the hands of established and reliable agents.

For the past twenty years, the majority of all patents taken out by Americans in foreign countries have been obtained through MUNN & CO.'S SCIENTIFIC AMERICAN PATENT AGENCY, and nearly all of this foreign patent business is still done by us. Our experience and success in this branch is very great.

The following summary will give a general idea of the expenses and duration of European Patents:

Great Britain.—Patents are granted for fourteen years to any person who is the inventor or the first importer. If a patent has been previously obtained in any other country, the British patent expires with it. The British patent extends over Great Britain and Ireland, but does not include

the Colonies. Separate patents are issued by the Colonies. The cost of a British patent is generally about $350, of which $100, for Provisional Protection, are payable at the time of making application, and the remainder in four months. Three years from the date of the patent a further sum of £50 must be paid, and a final sum of £100 at the end of seven years.

British Patents for designs, having reference to articles of utility, intended to protect the shape or configuration of the article, are granted for three years; expense, $100.

France.—Term of the patent, fifteen years. Annual fees, $20. Total expenses of obtaining, about $150.

Belgium.—Term of the patent, twenty years. Small annual fees. Expense of obtaining, about $150.

EXPENSE OF FOREIGN PATENTS—INCLUSIVE OF ALL FEES.

Austria,	$250	Netherlands,	$150
Bavaria,	150	Portugal,	250
Belgium,	150	Prussia,	200
Cuba,	450	Russia,	550
France,	150	Saxony,	250
Great Britain,	350	Spain,	400
India,	400	Sweden and Norway,	600
Italy,	250		

Parties intending to secure patents abroad will please address MUNN & Co., 37 Park Row, New-York, and obtain their *pamphlet* (free) relating exclusively to Foreign Patents.

CAUTION.—Pay no attention to the solicitations of foreign agents of unknown responsibility, who send circulars to parties whose names they copy from the patent lists of THE SCIENTIFIC AMERICAN.

CLEAR, dry, cold air contains more oxygen, is more bracing to the human system, and is heavier than moist air. People are accustomed to say that the air on damp days feels heavy; but the truth is, the air is lighter, and therefore the blood is less oxydized, and the feelings consequently depressed.

HOW TO SELL PATENTS.

In the prefatory portion of this little work, we have presented hints upon the general success of inventors, and the great value of even the simplest inventions. But it must not be supposed, because a patent is granted, that the world will run after an unknown man to buy from him an unknown patent. In order to sell a patent, judicious effort is required on the part of the inventor or his agent. Indeed, his final success will depend, to a considerable extent, upon his business tact and energy. He should make himself thoroughly conversant with the merits of his invention, and should prepare specimens or model machines thereof, made in the most perfect manner, so as readily to exhibit the operations of the improvement to others.

After obtaining a patent, the first grand requisite in effecting its sale is to make the merits and importance of the improvement *publicly known*. This may be done in various ways: by advertisements in newspapers, by cards, circulars, pamphlets, etc., by local and travelling agents. Some persons appoint agents in each town or county, giving them a liberal portion of the net proceeds for the sale of rights, or a handsome per cent upon the receipts for machines sold. In estimating the value of patent rights for different States, counties, etc., one very common method is to fix the price with reference to the amount of population.

One of the most comprehensive and powerful methods of bringing the merits of an invention before the public, is to have it noticed and engraved in The Scientific American. This paper, published weekly, has a large circulation. It is seen by probably not less than one or two hundred thousand readers, who comprise all of the most intelligent persons of scientific and mechanical acquirements in the country. The fact of publication in The Scientific Amer-

ICAN is a passport to their attention and favor. It is upon the judgment and advice of scientific and mechanical persons that the purchasers of patent rights and new inventions are apt to rely. "Yes, that is a good invention. It has been well illustrated in THE SCIENTIFIC AMERICAN, and I fully understand its construction. I advise you to purchase the right." We suppose that more patents are sold upon such advice than by all other agencies and means put together.

To assist the sale, it is always advisable to have the patent taken out through the SCIENTIFIC AMERICAN AGENCY. The study necessary to the preparation of the specification and drawings familiarizes our minds with the merits of the invention, and as all worthy inventions patented by us are noticed in THE SCIENTIFIC AMERICAN, we are enabled to speak of them with some degree of authority.

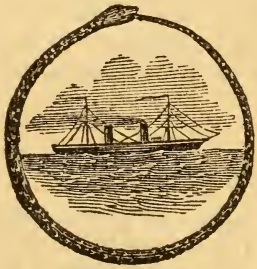
We keep artists constantly employed in preparing engravings for THE SCIENTIFIC AMERICAN. All our engravings are original. We never print old cuts. Parties who desire to have engravings inserted in THE SCIENTIFIC AMERICAN will please address MUNN & Co., 37 Park Row, New-York. After publication, the engravings will be returned to the owner, who can then use them for other papers, circulars, etc.

AGENTS TO SELL.

WE are often asked to give the names of parties who make it a business to sell patents. We are rarely enabled to do so. Such concerns are generally quite fugitive in their character. An office is opened, signs displayed, a few customers engaged, and then suddenly the shop is closed. The truth is, that the profit upon the sales of a single good patent is equivalent to a fortune, and the business it furnishes is enough to fully engage the attention of many persons. Our advice to patentees is: Take hold of the business of selling yourselves. If you want assistance, search for agents among your friends, and interest them specially in your invention.

ROYALTY.

One very profitable source of income from patents is *royalty*. This, in effect, involves a sort of contract between a patentee and a manufacturer, by which the latter, in consideration of license to make the thing, agrees to pay to the patentee a specified sum upon each article when sold. The patentee of the chimney-spring, now so commonly used to fasten chimneys upon lamps, was accustomed to grant licenses to manufacturers on receiving a royalty of a few cents per dozen. His income was at one time reported to be fifty thousand dollars a year from this source. Howe, the inventor of the sewing-machine, is said to receive a royalty of from five to ten dollars on each machine, and his annual income has been estimated at five hundred thousand dollars. We might give many examples of success. The license and royalty plan is oftentimes the most profitable method of employing patents.



A Circle is the most capacious of all plain figures, or contains the greatest area within the same outline or perimeter.

To find the circumference of a circle, multiply the diameter by 3.1416, and the product will be the circumference.

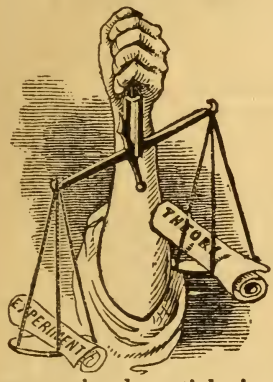
To find the diameter of a circle, divide the circumference by 3.1416, and the quotient will be the diameter.

Any circle whose diameter is double that of another, contains four times the area of the other.

Some employers think themselves entitled to the ownership of all inventions made by their workmen. But this is not so. Employers have no claim to the inventions of their workmen unless it can be shown that the latter was specially employed to bring out such inventions.

[From The Scientific American.]

PATENTS ON SMALL THINGS.



An English firm has lately patented a peculiar shape for candle-ends. By making them conical, or tapering, they will fit any candlestick without being papered or tinkered up in other ways. Now, a very small royalty on each pound of candles will give a large annual revenue to the inventors, and the pecuniary value of their idea is seen at once. Similar instances might be given from cases at home, where inventors have originated some simple article in daily use and secured it, they have received large rewards. "Despise not the day of small things," says the proverb, and we may say, in addition, deride no idea as useless that tends to advance the arts and sciences, merely because it seems simple.

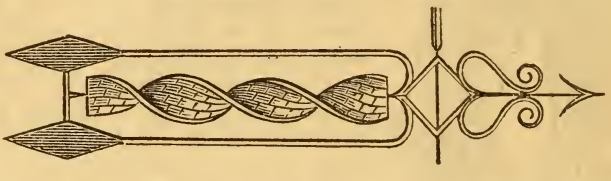
A very great misconception prevails in the minds of many persons in respect to patents. They are regarded chiefly as stepping-stones to fame or passports to future notoriety. This is a huge delusion. An invention is first and principally an investment, just as an artist's picture, although an inspiration, is a commercial venture. The glory and renown attaching to either picture or invention is the afterpart, the dessert to the solid feast on dollars and cents. The natural result of the mistake alluded to is to lead persons to underrate the value of their ideas. It is not at all uncommon to hear individuals exclaim, "What! get a patent on that thing!" in alluding to some little affair that can be carried in the pocket. That very despised "thing" will doubtless be the foundation of a good fortune, as many a similar article has been before it.

The improvement in some art or manufacture suggests itself to an individual, and he straightway applies it to his own use with very great advantage. Now, what shall he do? Patent it and secure the fruit of his genius to him-

self, or give it to the world without price? The business man would say the former; because if notoriety be the object, great patents confer not only means, but distinction, and where the first is attained, the second follows.

[From The Scientific American.]

A SPARKLING VANE.



A VERY curious and elegant vane for buildings may be made by placing in the centre a spiral or twisted spindle, as shown in the above cut. This spindle should be hung on delicate pivots, and the spaces between the spiral flanches nearly covered with small pieces of looking-glass or thin pieces of mica. The least breeze will put it in motion, and as the reflectors will assume every possible position, several of them will be sure to present the reflection of the sun at every revolution, from whatever point it may be viewed, thus producing a constant and very brilliant sparkling.

ELECTRICAL CONDUCTING POWER OF METALS.

THE effect of the electrical discharge on metallic bodies is to raise their temperature to a less or greater degree, according to their conducting power. The best conductors are silver and copper; the poorest, lead; as will be seen from the subjoined table:

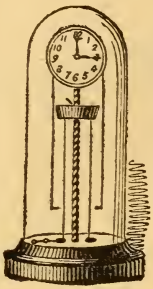
	Heat evolved.	Conducting Power.
Silver,	6	120
Copper,	6	120
Gold,	9	80
Zinc,	18	40
Platinum,	30	24
Iron,	30	24
Tin,	36	20
Lead,	72	12

[From The Scientific American.]

IMPORTANT TO INVENTORS.

The United States Patent Office at Washington contains nearly 50,000 models pertaining to patented inventions, all of which are open to public inspection and examination, together with the drawings and specifications relating thereto. But the distance of the Capital and the time and expense involved in a journey thither deter, in fact, the majority of inventors from reaping the advantages which a personal examination of previously patented inventions might oftentimes give them. To obviate this difficulty we (Munn & Co.) are in the habit of making these examinations at the Patent Office for inventors. When it is desired to ascertain definitely whether an invention, believed to be new, has been previously made, or to what extent, if any, it has been anticipated, the applicant sends to us a rough sketch and description of the device. We then make a thorough examination in the Patent Office at Washington, and report the result to the applicant. The charge for this service is only $5, and it is frequently the means of saving the applicant the entire expense of preparing a model, paying Government fees, etc., by revealing the fact that the whole or material portion of his improvement was previously known. This preliminary examination is sometimes also of importance in assisting to properly prepare the papers, so as to avoid conflicting with other inventions in the same class. The reader should carefully note the distinction made between this preliminary examination at the Patent Office and the examination and opinion given at our office, either orally or by letter, for which no fee is expected. It is only when a special search is made at the Patent Office that the fee of $5 is required. We are able, in a vast number of cases submitted to us, to decide the question of patentability without this special search. See page 6 of this little work.

When the air is exhausted from a pump-tube, (usually done by means of a piston,) the pressure of the atmosphere will cause the water to rise in the tube to a height of thirty feet.



"THE SCIENTIFIC AMERICAN.—We are sure that if a few words of seasonable commendation should induce any of that large class of intelligent readers who can appreciate true merit, to subscribe for this excellent publication, we shall be abundantly rewarded in the conviction of having earned their gratitude. It is only recently that we have looked into its columns with any degree of regularity, and we take an early opportunity to express the extreme satisfaction and interest which we have experienced in doing so. To condense our idea of its most valuable characteristic into one sentence, we consider THE SCIENTIFIC AMERICAN as embodying the highest function of all science, namely, its application to the practical, every-day concerns of life, in clear, pure, agreeable language. It will prove a pleasant guest and a useful companion at any fireside it may enter."—*Watchman, Greenport, L. I.*

THE SCIENTIFIC AMERICAN ought to be taken, read, and studied by every intelligent man, young or old, worker or idler, rich or poor, in the country. It commends itself to every one, and is useful and interesting to all. The most scientific may learn from it, and the unscientific understand it. It has a peculiar charm about it that interests and affects every person with a grain of sense in his head. We are in the habit of sending our copy, after a thorough perusal, to the army, and the friend who receives it writes us, that he likes it better than any other paper; that it is longingly waited for, and eagerly read by his comrades, and never ceases its circulation until so bethumbed that its columns are no longer readable.—*Westchester County Journal.*

Remember that, by subscribing to THE SCIENTIFIC AMERICAN, you receive, in the course of the year, an amount of reading matter nearly equal to *four thousand ordinary book pages.*

THE light of lightning and its reflections, will penetrate from 150 to 200 miles.

HORSE-POWER.

When Watt began to introduce his steam-engines he wished to be able to state their power as compared with that of horses, which were then generally employed for driving mills. He accordingly made a series of experiments, which led him to the conclusion that the average power of a horse was sufficient to raise about 33,000 lbs. one foot in vertical height per minute, and this has been adopted in England and this country as the general measure of power.

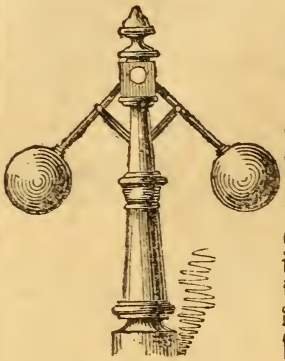
A waterfall has one horse-power for every 33,000 lbs. of water flowing in the stream per minute, for each foot of fall. To compute the power of a stream, therefore, multiply the area of its cross section in feet by the velocity in feet per minute, and we have the number of cubic feet flowing along the stream per minute. Multiply this by $62\frac{1}{2}$, the number of pounds in a cubic foot of water, and this by the vertical fall in feet, and we have the foot-pounds per minute of the fall; dividing by 33,000 gives us the horse-power.

For example: A stream flows through a flume 10 feet wide, and the depth of the water is 4 feet; the area of the cross section will be 40 feet. The velocity is 150 feet per minute—$40 \times 150 = 6000$=the cubic feet of water flowing per minute. $6000 \times 62\frac{1}{2} = 375{,}000$=the pounds of water flowing per minute. The fall is 10 feet; $10 \times 375{,}000 = 3{,}750{,}000$=the foot-pounds of the water-fall. Divide 3,750,000 by 33,000, and we have $113\frac{1}{3}$ as the horse-power of the fall.

The power of a steam-engine is calculated by multiplying together the area of the piston in inches, the mean pressure in pounds per square inch, the length of the stroke in feet, and the number of strokes per minute; and dividing by 33,000.

Water-wheels yield from 50 to 91 per cent of the water. The actual power of a steam-engine is less than the indicated power, owing to a loss from friction; the amount of this loss varies with the arrangement of the engine and the perfection of the workmanship.

ZUR BEACHTUNG FÜR DEUTSCHE ERFINDER.



Die Unterzeichneten haben eine Anleitung herausgegeben, welche angiebt was zu befolgen ist um ein Patent zu sichern, und selbige wird auf portofreie Anfrage gratis abgegeben.

Nach dem neuen Patent-Gesetze können Bürger aller Länder, mit einer einzigen Ausnahme, Patente in den Vereinigten Staaten zu denselben Bedingungen erlangen, wie die Bürger der Vereinigten Staaten selbst.

Munn & Co.,

No. 37 Park Row, New-York.

Scientific American Office.

SOMETHING TO BE REMEMBERED.

American Patents, granted to foreigners, become invalid, if the patent is not put and continued on sale, on reasonable terms, within eighteen months from the date of the patent. Law of 1836, section 15, page 61.

HEAT-CONDUCTING POWER OF DIFFERENT BODIES.

Gold,	1000	Tin,	304
Platinum,	981	Lead,	180
Silver,	973	Marble,	24
Copper,	898	Porcelain,	12
Iron,	374	Fire Clay,	11
Zinc,	363	Fire Brick,	11

RELATIVE CONDUCTING POWER OF FLUIDS.

Mercury,	1000	Proof Spirit,	312
Water,	357	Alcohol, (pure,)	232

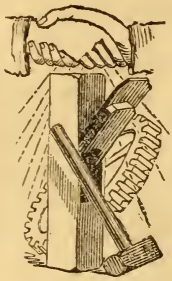
[From the Scientific American.]

FIELD FOR CHEMICAL INVENTION.

Less than five per cent of all the patents issued are for chemical inventions. The first impression which this fact leaves is that the chemists are not so wide awake as the mechanics. And it seems, too, as if the chemists have the best chance, for they have the range of all the combinations, almost infinite in number, of all the sixty or more simple substances or elements, while the mechanic is limited in all his inventions to the use of only five mechanical elements. But this course of reasoning is a little unfair for the chemist, if we wish to determine his real merit as a benefactor of mankind. Thus far the introduction of new substances has been too slow and too much the result of chance. Illuminating gas was known as a chemical product for centuries before any use of it was made; iodine, chromine, chloroform, aniline, and a hundred other things, now common, were for a very long time only rare specimens on the shelves of the chemist's curiosity-shop, before they were found to be of the greatest value to men, and we cannot have a doubt that much more of the same kind of wealth is soon to be developed. May we not reasonably expect that virtues may be discovered in things now neglected, which will directly lead to the invention of arts more wonderful and more useful than photography or electro-telegraphing?

A correspondent, writing from Buffalo, says, in speaking of the value of The Scientific American to its host of readers: "I would as soon think of going without supper on Thursday night as to neglect to call at the book-store for the *Paper of papers;* and I am proud to say that I have influenced many others to 'go and do likewise.' I have my volumes complete and nicely bound from volume five; and should poverty ever compel me to sell my library, my *Bible* and my Scientific American should remain to grace the otherwise empty shelves."

A WORD TO INQUIRERS.



We frequently receive letters containing long strings of trifling questions, relative to all sorts of things, without any fee to pay us for our time in obtaining the information, nor even stamps for postage or stationery. Many of these correspondents close their letters with the comforting assurance that "I would remit for your trouble, but do not know how much to send." To relieve the consciences of all such doubters, we would recommend them to send a dollar or more, according to the value to them of the desired information. If the latter is of no value, they ought not to trouble us with their fly-tracks.

To certain other classes of inquirers the following hints may be useful: The best washing-machines, the best straw-cutters, the best churns, the best brick-machines, the best engines, the best sewing-machines, the best of every thing in the mechanical line, is advertised and illustrated in The Scientific American, and the address of the parties having such things on sale is there given. Write directly to them for the information you want, and spare us. If you cannot at first find what you desire, read the back numbers of The Scientific American. Do not expect us to do the work for you unless you send a small remittance.

To find the area of an ellipsis, multiply the long diameter by the short diameter and by .7854; the product will be the area.

Never relate your misfortunes, and never grieve over what you cannot prevent.

To find the area of a circle, multiply the square of the diameter by the decimal .7854. Or multiply the circumference by the radius, and divide the product by 2.

THE

PATENT LAWS

OF THE

UNITED STATES OF AMERICA.

☞ The following are the existing Laws under which American Patents are granted and supported by the courts.

To save space we omit such portions as have been repealed, or that relate to salaries of officials, and other unimportant details not pertaining to patents.

PATENT LAW OF 1836.

AN ACT to promote the progress of Useful Arts, and to repeal all acts and parts of acts heretofore made for that purpose.

ESTABLISHMENT OF THE PATENT OFFICE.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled: That there shall be established and attached to the Department of State,* an office, to be denominated the Patent Office, the chief officer of which shall be called the Commissioner of Patents, to be appointed by the President, by and with the advice and consent of the Senate, whose duty it shall be, under the direction of the Secretary of State, to superintend, execute, and perform all such acts and things touching and respecting the granting and issuing of patents for new and useful discoveries, inventions, and improvements,

* Now attached to Department of Interior.

as are herein provided for, or shall hereafter be, by law, directed to be done and performed, and shall have charge and custody of all the books, records, papers, models, and machines, and all other things belonging to said office, * * * and shall be entitled to send and receive letters and packages by mail, relating to the business of the office, free of postage.

SEC. 2. [Relates to the appointment of clerks and other officials.]

PATENT OFFICE EMPLOYEES MUST NOT BE INTERESTED IN PATENTS.

* * * And said Commissioner, clerks, and every other person appointed and employed in said office, shall be disqualified and interdicted from acquiring or taking, except by inheritance, during the period for which they shall hold their appointments respectively, any right or interest, directly or indirectly, in any patent for an invention or discovery which has been, or may hereafter be, granted.

SEC 3. [Relates to oaths and sureties of clerks.]

SEAL OF OFFICE, COPYING, ETC.

SEC. 4. *And be it further enacted*, That the said Commissioner shall cause a seal to be made and provided for the said office, with such devices as the President of the United States shall approve; and copies of any records, books, papers, or drawings, belonging to the said office, under the signature of the said Commissioner, or, when the office shall be vacant, under the signature of the chief clerk, with the said seal affixed, shall be competent evidence in all cases in which the original records, books, papers, or drawings could be evidence. And any person making application therefor may have certified copies of the records, drawings, and other papers deposited in said office, on paying for the written copies the sum of ten cents for every page of one hundred words; and for copies of drawings, the reasonable expenses of making the same.

RECORD OF PATENTS, ETC.

SEC. 5. *And be it further enacted*, That all patents issuing from said office shall be issued in the name of the

United States, and under the seal of said office, and be signed by the Secretary of State,* and countersigned by the Commissioner of said office, and shall be recorded, together with the descriptions, specifications, and drawings, in the said office, in books to be kept for that purpose. Every such patent shall contain a short description or title of the invention or discovery, correctly indicating its nature and design, and in its terms grant to the applicant or applicants, his or their heirs, administrators, executors, or assigns, for a term not exceeding fourteen years, [changed to seventeen years,] the full and exclusive right and liberty of making, using, and vending to others to be used, the said invention or discovery, referring to the specifications for the particulars thereof, a copy of which shall be annexed to the patent, specifying what the patentee claims as his invention or discovery.

WHO MAY OBTAIN PATENTS, AND HOW.

SEC. 6. *And be it further enacted*, That any person or persons having discovered or invented any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement on any art, machine, manufacture, or composition of matter, not known or used by others before his or their discovery or invention thereof, and not at the time of his application for a patent in public use or on sale, with his consent or allowance, as the inventor or discoverer, and shall desire to obtain an exclusive property therein, may make application, in writing, to the Commissioner of Patents, expressing such desire; and the Commissioner, on due proceedings had, may grant a patent therefor. But before any inventor shall receive a patent for any such new invention or discovery, he shall deliver a written description of his invention or discovery, and of the manner and process of making, constructing, using, and compounding the same, in such full clear, and exact terms, avoiding unnecessary prolixity, as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of

* Secretary of the Interior. See Section Law of 1849, page 72.

any machine, he shall fully explain the principle, and the several modes in which he has contemplated the application of that principle or character by which it may be distinguished from other inventions; and shall particularly specify and point out the part, improvement, or combination which he claims as his own invention or discovery. He shall, furthermore, accompany the whole with a drawing or drawings, and written references, where the nature of the case admits of drawings; or with specimens of ingredients, and of the composition of matter, sufficient in quantity for the purpose of experiment, where the invention or discovery is of a composition of matter; which descriptions and drawings, signed by the inventor, and attested by two witnesses, shall be filed in the Patent Office; and he shall, moreover, furnish a model of his invention, in all cases which admit of a representation by model, of a convenient size to exhibit advantageously its several parts. The applicant shall make oath or affirmation that he does verily believe that he is the original and first inventor or discoverer of the art, machine, composition, or improvement for which he solicits a patent; and that he does not know or believe that the same was ever before known or used; and also of what country he is a citizen; which oath or affirmation may be made before any person authorized by law to administer oaths.

OFFICIAL EXAMINATIONS.

SEC. 7. *And be it further enacted*, That on the filing of any such application, description, and specification, and the payment of the duty hereinafter provided,* the Commissioner shall make, or cause to be made, an examination of the alleged new invention or discovery; and if, on any such examination, it shall not appear to the Commissioner that the same had been invented or discovered by any other person in this country, prior to the alleged invention or discovery thereof by the applicant, or that it had been patented or described in any printed publication in this or any foreign country, or had been in public use or on sale, with the ap-

* See Section 10, page 76.

plicant's consent or allowance, prior to the application, if the Commissioner shall deem it to be sufficiently useful and important, it shall be his duty to issue a patent therefor. But whenever, on such examination, it shall appear to the Commissioner that the applicant was not the original and first inventor or discoverer thereof, or that any part of that which is claimed as new had before been invented or discovered, or patented or described in any printed publication in this or any foreign country as aforesaid, or that the description is defective and insufficient, he shall notify the applicant thereof, giving him briefly such information and references as may be useful in judging of the propriety of renewing his application, or of altering his specification to embrace only that part of the invention or discovery which is new. * * *

INTERFERENCES.

SEC. 8. *And be it further enacted*, That whenever an application shall be made for a patent, which, in the opinion of the Commissioner, would interfere with any other patent for which an application may *o*e pending, or with any unexpired patent which shall have been granted, it shall be the duty of the Commissioner to give notice thereof to such applicants or patentees, as the case may be; and if either shall be dissatisfied with the decision of the Commissioner on the question of priority of right or invention, on a hearing thereof, he may appeal from such decision, on the like terms and conditions as are provided in the preceding section of this act, and the like proceedings shall be had, to determine which, or whether either, of the applicants is entitled to receive a patent as prayed for. But nothing in this act contained shall be construed to deprive an original and true inventor of the right to a patent for his invention by reason of his having previously taken out letters patent therefor in a foreign country, and the same having been published at any time within six months next preceding the filing of his specification and drawings. * * *

SEC. 9. [Relates to patent fees. This section fixed the fee for American citizens at thirty dollars; subjects of Great Britain five hundred dollars, and all other persons three

hundred dollars. This was changed by the law of 1861, (see Section 10, page 76.) All persons, without distinction as to nationality, now pay thirty-five dollars, except the inhabitants of those countries that discriminate against American citizens. In Canada, an American cannot obtain patents. Hence Canadians are charged five hundred dollars for an American patent. It is expected that the Canadian law will be changed so as to remove this discrimination.]

THE HEIRS OF AN INVENTOR MAY OBTAIN A PATENT.

SEC. 10. *And be it further enacted*, That where any person hath made, or shall have made, any new invention, discovery, or improvement, on account of which a patent might by virtue of this act be granted, and such person shall die before any patent shall be granted therefor, the right of applying for and obtaining such patent shall devolve on the executor or administrator of such person, in trust for the heirs-at-law of the deceased, in case he shall have died intestate; but if otherwise, then in trust for his devisees, in as full and ample manner, and under the same conditions, limitations, and restrictions as the same was held, or might have been claimed or enjoyed, by such person in his or her lifetime; and when application for a patent shall be made by such legal representatives, the oath or affirmation provided in the 6th section of this act shall be so varied as to be applicable to them.

PATENTS MAY BE ASSIGNED.

SEC. 11. *And be it further enacted*, That every patent shall be assigned in law, either as to the whole interest or any undivided part thereof, by any instrument in writing; which assignment, and also every grant and conveyance of the exclusive right, under any patent, to make and use, and to grant to others to make and use, the thing patented within and throughout any specified part or portion of the United States, shall be recorded in the Patent Office within three months from the execution thereof. * * *

CAVEATS.

SEC. 12. *And be it further enacted*, That any citizen of the United States, or alien who shall have been a resident of the United States one year next preceding, and shall have made oath of his intention to become a citizen thereof, who shall have invented any new art, machine, or improvement thereof, and shall desire further time to mature the same, may * * * file in the Patent Office a caveat setting forth the design and purpose thereof, and its principal and distinguishing characteristics, and praying protection of his right till he shall have matured his invention. * * * And such caveat shall be filed in the confidential archives of the office, and preserved in secrecy. And if application shall be made by any other person, within one year from the time of filing such caveat, for a patent of any invention with which it may in any respect interfere, it shall be the duty of the Commissioner to deposit the description, specifications, drawings, and model, in the confidential archives of the office, and to give notice (by mail) to the person filing the caveat of such application, *who shall within three months* after receiving the notice, if he would avail himself of the benefit of his caveat, file his description, specifications, drawings, and model; and if, in the opinion of the Commissioner, the specifications of claim interfere with each other, like proceedings may be had in all respects as are in this act provided in the case of interfering applications; *Provided, however*, That no opinion or decision * * * under the provisions of this act, shall preclude any person interested in favor of or against the validity of any patent which has been or may hereafter be granted, from the right to contest the same in any judicial court, in any action in which its validity may come in question.

RE-ISSUES.

SEC. 13. *And be it further enacted*, That whenever any patent which has heretofore been granted, or which shall hereafter be granted, shall be inoperative or invalid, by reason of a defective or insufficient description or specification, or by reason of the patentee claiming in his specification, as his own invention, more than he had or shall have a

right to claim as new, if the error has or shall have arisen by inadvertency, accident, or mistake, and without any fraudulent or deceptive intention, it shall be lawful for the Commissioner, upon the surrender to him of such patent, * * * to cause a new patent to be issued to the said inventor for the same invention, for the residue of the period then unexpired for which the original patent was granted, in accordance with the patentee's corrected description and specification.* And in case of his death or any assignment by him made of the original patent, a similar right shall vest in his executors, administrators, or assignees. And the patent so reïssued, together with the corrected description and specifications, shall have the same effect and operation in law, on the trial of all actions hereafter commenced for causes subsequently accruing, as though the same had been originally filed in such corrected form, before the issuing of the original patent.* * * *

SUITS AT LAW.

SEC. 14. *And be it further enacted*, That whenever, in any action for damages [for] making, using, or selling the thing whereof the exclusive right is secured by any patent heretofore granted, or by any patent which may hereafter be granted, a verdict shall be rendered for the plaintiff in such action, it shall be in the power of the court to render judgment of any sum above the amount found by such verdict as the actual damages sustained by the plaintiff, not exceeding three times the amount thereof, according to the circumstances of the case, with costs; and such damages may be recovered by action on the case, in any court of competent jurisdiction, to be brought in the name or names of the person or persons interested, whether as patentee, assignee, or as grantees of the exclusive right within and throughout a specified part of the United States.

SUITS AT LAW.—FOREIGN PATENTS INVALID IF THE INVENTION IS NOT PUT ON SALE WITHIN EIGHTEEN MONTHS FROM THE DATE OF PATENT.

SEC. 15. *And be it further enacted*, That the defendant in any such action shall be permitted to plead the general

* See Section 5, page 65.

issue, and to give this act and any special matter in evidence, of which notice in writing may have been given to the plaintiff or his attorney, thirty days before trial, tending to prove that the description and specification filed by the plaintiff does not contain the whole truth relative to his invention or discovery, or that it contains more than is necessary to produce the described effect; which concealment or addition shall fully appear to have been made for the purpose of deceiving the public, or that the patentee was not the original and first inventor or discoverer of the thing patented, or of a substantial and material part thereof claimed as new, or that it has been described in some public work anterior to the supposed discovery thereof by the patentee, or had been in public use or on sale with the consent and allowance of the patentee before his application for a patent, or that he had surreptitiously or unjustly obtained the patent for that which was in fact invented or discovered by another, who was using reasonable diligence in adapting and perfecting the same; or that the patentee, if an alien at the time the patent was granted, had failed and neglected, for the space of eighteen months from the date of the patent, to put and continue on sale to the public, on reasonable terms, the invention or discovery for which the patent issued; and whenever the defendant relies in his defence on the fact of a previous invention, knowledge, or use of the thing patented, he shall state, in his notice of special matters, the names and places of residence of those whom he intends to prove to have possessed a prior knowledge of the thing, and where the same had been used; in either of which cases judgment shall be rendered for the defendant with costs: *Provided, however*, That whenever it shall satisfactorily appear that the patentee, at the time of making his application for the patent, believing himself to be the first inventor or discoverer of the thing patented, the same shall not be held to be void on account of the invention or discovery, or any part thereof, having been before known or used in any foreign country; it not appearing that the same or any substantial part thereof had before been patented or described in any printed publication: *And provided, also*, That whenever the plaintiff shall fail to sustain his action on the ground that in his specification or claim is

embraced more than that of which he was the first inventor, if it shall appear that the defendant had used or violated any part of the invention justly and truly specified and claimed as new, it shall be in the power of the court to adjudge and award, as to costs, as may appear to be just and equitable.* * * *

PATENTS MAY BE DECLARED VOID.

SEC. 16. *And be it further enacted*, That whenever there shall be two interfering patents, or whenever a patent or application shall have been refused * * * on the ground that that patent applied for would interfere with an unexpired patent previously granted, any person interested in any such patent, either by assignment or otherwise in the one case, and any such applicant in the other case, may have remedy by bill in equity; and the court having cognizance thereof, on notice to adverse parties, and other due proceedings had, may adjudge and declare either the patents void in the whole or in part, or inoperative and invalid in any particular part or portion of the United States, according to the interest which the parties to such suit may possess in the patent or the inventions patented; and may also adjudge that such applicant is entitled, according to the principles and provisions of this act, to have and receive a patent for his invention, as specified in his claim, or for any part thereof, as the fact of priority of right or invention shall, in any such case, be made to appear. And such adjudication, if it be in favor of the right of such applicant, shall authorize the Commissioner to issue such patent, on his filing a copy of the adjudication, and otherwise complying with the requisitions of this act: *Provided*, *however*, That no such judgment or adjudication shall affect the rights of any person, except the parties to the action, and those deriving title from or under them subsequent to the rendition of such judgment.*

COURTS TO HAVE POWERS, ETC.

SEC. 17. *And be it further enacted*, That all actions, suits, controversies, and cases arising under any law of the United

* See Section 9, page 66.

States, granting or confirming to inventors the exclusive right to their inventions or discoveries, shall be originally cognizable, as well in equity as at law, by the circuit courts of the United States, or any district court having the powers and jurisdiction of a circuit court; which courts shall have power, upon a bill in equity filed by any party aggrieved, in any such case, to grant injunctions according to the course and principles of courts of equity, to prevent the violation of the rights of any inventor as secured to him by any law of the United States, on such terms and conditions as said courts may deem reasonable: *Provided, however*, That from all judgments and decrees from any such court rendered in the premises, a writ of error or appeal, as the case may require, shall lie to the Supreme Court of the United States, in the same manner and under the same circumstances as is now provided by law in other judgments and decrees of circuit courts, and in all other cases in which the court shall deem it reasonable to allow the same.

EXTENSION OF PATENTS.

SEC. 18. *And be it further enacted*, That whenever any patentee of an invention or discovery shall desire an extension of his patent beyond the term of its limitation,* he may make application therefor, in writing, to the Commissioner of the Patent Office, setting forth the grounds thereof; and the Commissioner shall * * * cause to be published in one or more of the principal newspapers in the City of Washington, and in such other paper or papers as he may deem proper, published in the section of country most interested adversely to the extension of the patent, a notice of such application, and of the time and place when and where the same will be considered, that any person may appear and show cause why the extension should not be granted. And the Secretary of State, the Commissioner of the Patent Office, and the Solicitor of the Treasury shall constitute a board † to hear and decide upon the evidence

* See Section 11, page 76, and Section 16, page 79.
† Repealed—See Section 1, page 71.

produced before them, both for and against the extension, and shall sit for that purpose at the time and place designated in the published notice thereof. The patentee shall furnish a statement, in writing, under oath, of the ascertained value of the invention, and of his receipts and expenditures, sufficiently in detail to exhibit a true and faithful account of loss and profit in any manner accruing to him from and by reason of said invention. And if, upon a hearing of the matter, it shall appear to the full and entire satisfaction of said [Commissioner], having due regard to the public interest therein, that it is just and proper that the term of the patent should be extended, by reason of the patentee, without neglect or fault on his part, having failed to obtain, from the use and sale of his invention, a reasonable remuneration for the time, ingenuity, and expense bestowed upon the same, and the introduction thereof into use, it shall be the duty of the Commissioner to renew and extend the patent, by making a certificate thereon of such extension, for the term of seven years from and after the expiration of the first term; * * * and thereupon the said patent shall have the same effect in law as though it had been originally granted for the term of twenty-one years; and the benefit of such renewal shall extend to assignees and grantees of the right to use the thing patented, to the extent of their respective interests therein: *Provided, however*, That no extension of a patent shall be granted after the expiration of the term for which it was originally issued.

SEC. 19. [Relates to books, etc., for a library.]

SEC. 20. [Relates to the classification, and public exhibition of models, etc., in the Patent Office.]

SEC. 21. [Relates to actions and cases sued or pending under previous laws.]

Approved July 4, 1836.

PATENT LAW OF 1837.

[Sections 1, 2, 3, 4, relate to means for obtaining new copies of the patents, records, and models, which were destroyed by the burning of the Patent Office in December, 1836. Only a small portion of the old patents and models were ever obtained under this act.]

A PATENT MAY BE DIVIDED INTO SEVERAL SEPARATE PATENTS.

SEC. 5. *And be it further enacted*, That whenever a patent shall be returned for correction and reïssue, under the thirteenth section of the act [of 1836] to which this is additional, and the patentee shall desire several patents to be issued for distinct and separate parts of the thing patented, he shall first pay, in manner and in addition to the sum provided by that act, the sum of thirty dollars for each additional patent so to be issued.

ASSIGNMENTS, DRAWINGS, ETC.

SEC. 6. *And be it further enacted*, That any patent hereafter to be issued may be made and issued to the assignee or assignees of the inventor or discoverer, the assignment thereof being first entered of record, and the application therefor being duly made, and the specification duly sworn to by the inventor. And in all cases hereafter the applicant for a patent shall be held to furnish duplicate drawings, whenever the case admits of drawings, one of which to be deposited in the office, and the other to be annexed to the patent, and considered a part of the specification.

DISCLAIMERS.

SEC. 7. *And be it further enacted*, That whenever any patentee shall have, through inadvertence, accident, or mistake, made his specification of claim too broad, claiming more than that of which he was the original or first inventor, some material and substantial part of the thing patented being truly and justly his own, any such patentee, his administrators, executors, and assigns, whether of the whole or of a sectional interest therein, may make disclaimer of such parts of the thing patented as the disclaimant shall not

claim to hold by virtue of the patent or assignment, stating therein the extent of his interest in such patent; which disclaimer shall be in writing, attested by one or more witnesses, and recorded in the Patent Office, on payment by the person disclaiming, in manner as other patent duties are required by law to be paid, of the sum of ten dollars. And such disclaimer shall thereafter be taken and considered as part of the original specification, to the extent of the interest which shall be possessed in the patent or right secured thereby, by the disclaimant, and by those claiming by or under him, subsequent to the record thereof. But no such disclaimer shall affect any action pending at the time of its being filed, except so far as may relate to the question of unreasonable neglect or delay in filing the same.

REISSUES

SEC. 8. *And be it further enacted*, That whenever application shall be made to the Commissioner for any addition of a newly discovered improvement to be made to an existing patent, or whenever a patent shall be returned for correction and reïssue, the specification of claim annexed to every such patent shall be subject to revision and restriction, in the same manner as are original applications for patents; the Commissioner shall not add any such improvement to the patent in the one case, nor grant the reïssue in the other case, until the applicant shall have entered a disclaimer, or altered his specification of claim in accordance with the decision of the Commissioner; and in all such cases the applicant, if dissatisfied with such decision, shall have the same remedy, and be entitled to the benefit of the same privileges and proceedings as are provided by law in the case of original applications for patents. [See change as to additional improvements, law of 1861, page 75, section 9.]

VALIDITY OF PARTS OF THE PATENT.

SEC. 9. *And be it further enacted*, (any thing in the fifteenth section of the act to which this is additional to the contrary notwithstanding,) That whenever, by mistake, accident, or inadvertence, and without any wilful default or intent to defraud or mislead the public, any patentee shall

have, in his specification, claimed to be the original and first inventor or discoverer of any material or substantial part of the thing patented, of which he was not the first and original inventor, and shall have no legal or just right to claim the same, in every such case the patent shall be deemed good and valid for so much of the invention or discovery as shall be truly and *bona fide* his own: *Provided*, It shall be a material and substantial part of the thing patented, and be definitely distinguishable from the other parts so claimed without right as aforesaid. And every such patentee, his executors, administrators, and assigns, whether of a whole or of a sectional interest therein, shall be entitled to maintain a suit at law or in equity on such patent for any infringement of such part of the invention or discovery as shall be *bona fide* his own as aforesaid, notwithstanding the specification may embrace more than he shall have any legal right to claim. But in every such case in which a judgment or verdict shall be rendered for the plaintiff, he shall not be entitled to recover costs against the defendant, unless he shall have entered at the Patent Office, prior to the commencement of the suit, a disclaimer of all that part of the thing patented which was so claimed without right: *Provided, however*, That no person bringing any such suit shall be entitled to the benefits of the provisions contained in this section who shall have unreasonably neglected or delayed to enter at the Patent Office a disclaimer as aforesaid.

SEC. 10. [Repealed. Related to model agents.]

SEC. 11. [Relates to clerks and copying.]

SEC. 12. [Relates to refunding of money in rejected cases, which by the law of 1861, section 9, is forbidden.]

OATH OR AFFIRMATION.

SEC. 13. *And be it further enacted*, That in all cases in which an oath is required by this act, or by the act to which this is additional, if the person of whom it is required shall be conscientiously scrupulous of taking an oath, affirmation may be substituted therefor.

SEC. 14. [Relates to salaries and expenses of the Patent Office, Commissioner's report, etc.]

Approved March 3, 1837.

PATENT LAW OF 1839.

SEC. 1, 2, 3, 4, 5, relate to employés at the Patent Office, expenses thereof, patent lists, and books.

FOREIGN INVENTIONS MAY BE PATENTED IF NOT PUBLICLY INTRODUCED PRIOR TO THE APPLICATION.

SEC. 6. *And be it further enacted*, That no person shall be debarred from receiving a patent for any invention or discovery, as provided in the act approved on the fourth day of July, one thousand eight hundred and thirty-six, to which this is additional, by reason of the same having been patented in a foreign country more than six months prior to his application: *Provided*, That the same shall not have been introduced into public and common use in the United States prior to the application for such patent: *And provided, also*, That in all cases every such patent shall be limited to the term of fourteen* years from the date or publi cation of such foreign letters patent.

MACHINES, ETC., MADE PRIOR TO THE PATENT MAY BE CONTINUED IN USE AFTER ISSUE OF THE PATENT.

SEC. 7. *And be it further enacted*, That every person or corporation who has, or shall have, purchased or constructed any newly invented machine, manufacture, or composition of matter, prior to the application by the inventor or discoverer for a patent, shall be held to possess the right to use, and vend to others to be used, the specific machine, manufacture, or composition of matter so made or purchased, without liability therefor to the inventor, or any other person interested in such invention; and no patent shall be held to be invalid by reason of such purchase, sale, or use, prior to the application for a patent as aforesaid, except on proof of abandonment of such invention to the public, or that such purchase, sale, or prior use, has been for more than two years prior to such application for a patent.

SEC. 8. [Relates to fees for recording, since changed.]

SEC. 9. [Relates to agricultural statistics.]

* Changed to seventeen years by the law of 1861. See page 79, section 16.

CONTESTED CASES.

SEC. 10. *And be it further enacted*, That the provisions of the sixteenth section of the before-recited act (law of 1836) shall extend to all cases where patents are refused for any reason whatever, either by the Commissioner of Patents or by the Chief-Justice of the District of Columbia, upon appeals from the decision of said Commissioner, as well as where the same shall have been refused on account of, or by reason of, interference with a previously existing patent; and in all cases where there is no opposing party a copy of the bill shall be served upon the Commissioner of Patents, when the whole of the expenses of the proceeding shall be paid by the applicant, whether the final decision shall be in his favor or otherwise.

APPEALS.

SEC. 11. *And be it further enacted*, That in cases where an appeal is now allowed by law from the decision of the Commissioner of Patents * * * the party, * * * shall have right to appeal to the Chief-Justice of the District Court of the United States for the District of Columbia, by giving notice thereof to the Commissioner, and filing in the Patent Office, within such time as the Commissioner shall appoint, his reasons of appeal, specifically set forth in writing, and also paying into the Patent Office, to the credit of the patent fund, the sum of twenty-five dollars. And it shall be the duty of said Chief-Justice, on petition, to hear and determine all such appeals, and to revise such decisions in a summary way, on the evidence produced before the Commissioner, at such early and convenient time as he may appoint, first notifying the Commissioner of the time and place of hearing, whose duty it shall be to give notice thereof to all parties who appear to be interested therein, in such manner as said judge shall prescribe. The Commissioner shall also lay before the said judge all the original papers and evidence in the case, together with the grounds of his decision, fully set forth in writing, touching all the points involved by the reasons of appeal, to which the revision shall be confined. And at the request of any party interested, or at the desire of the judge, the Commissioner

and the examiners in the Patent Officer may be examined, under oath, in explanation of the principles of the machine, or other thing, for which a patent in such case is prayed for. And it shall be the duty of the said judge, after a hearing of any such case, to return all the papers to the Commissioner, with a certificate of his proceedings and decision, which shall be entered of record in the Patent Office ; and such decision, so certified, shall govern the further proceedings of the Commissioner in such case: *Provided, however*, That no opinion or decision of the judge in any such case shall preclude any person interested in favor or against the validity of any patent which has been, or may hereafter be, granted, from the right to contest the same in any judicial court, in any action in which its validity may come in question.

SEC. 12. [Relates to rules in contested cases, and to examiners, but has been changed.]

SEC. 13. [Relates to fees to the justice.]

Approved March 3, 1839.

PATENT LAW OF 1842.

SECTION 1. [Authorizes the refunding of money paid by mistake in certain cases.]

SEC. 2. [Relates to patent records that were destroyed by fire in 1836.]

SEC. 3. [Repealed.]

TAKING THE OATH IN FOREIGN COUNTRIES.

SEC. 4. *And be it further enacted*, That the oath required for applicants for patents may be taken, when the applicant is not, for the time being, residing in the United States, before any minister plenipotentiary, chargé d'affaires, consul, or commercial agent holding commission under the government of the United States, or before any notary public of the foreign country in which such applicant may be.

PENALTY FOR STAMPING UNPATENTED ARTICLES.

SEC. 5. *And be it further enacted*, That if any person or persons shall paint, or print, or mould, cast, carve, or en-

grave, or stamp upon any thing made, used, or sold by him, for the sole making or selling which he hath not, or shall not have, obtained letters patent, the name, or any imitation of the name of any other person who hath, or shall have, obtained letters patent for the sole making and vending of such thing, without consent of such patentee, or his assigns or legal representatives; or if any person, upon any such thing not having been purchased from the patentee, or some person who purchased it from or under such patentee, or not having the license or consent of such patentee, or his assigns or legal representatives, shall write, paint, print, mould, cast, carve, engrave, stamp, or otherwise make or affix the word "patent," or the words "letters patent," or the word "patentee," or any word or words of like kind, meaning, or import, with the view or intent of imitating or counterfeiting the stamp, mark, or other device of the patentee, or shall affix the same, or any word, stamp, or device of like import, on any unpatented article, for the purpose of deceiving the public, he, she, or they, so offending, shall be liable for such offence to a penalty of not less than one hundred dollars, with costs, to be recovered by action in any of the circuit courts of the United States, or in any of the district courts of the United States having the powers and jurisdiction of a circuit court; one half of which penalty, as recovered, shall be paid to the patent fund, and the other half to any person who shall sue for the same.

SEC. 6. [Repealed.]

Approved August 29, 1842.

PATENT LAW OF 1848.

THE COMMISSIONER TO EXTEND PATENTS.

Be it enacted, etc., * * * That the power to extend patents, shall hereafter be vested solely in the Commissioner of Patents; and when an application is made to him for the extension of a patent, * * * he shall refer the case to the principal examiner having charge of the class of inventions to which said case belongs, who shall make a full report to

said Commissioner of the said case, and particularly whether the invention or improvement secured in the patent was new and patentable when patented; * * * but no patent shall be extended for a longer term than seven years.

SEC. 2. [Relates to record fees—since changed.]

SEC. 3. [Relates to clerks and copying.]

SEC. 4. [Relates to Patent Reports, etc.]

Approved May 27, 1848.

PATENT LAW OF 1849.

And be it further enacted, That the Secretary of the Interior shall exercise and perform all the acts of supervision and appeal in regard to the office of Commissioner of Patents, now exercised by the Secretary of State.

PATENT LAW OF 1852.

JUDGES TO HEAR APPEALS.

Be it enacted, etc., That appeals provided for in the eleventh section of the act, (law of 1839,) * * * may also be made to either of the assistant judges of the Circuit Court of the District of Columbia; and all the powers, duties, and responsibilities imposed by the aforesaid act, and conferred upon the chief judge, are hereby imposed and conferred upon each of the said assistant judges.

SEC. 2. *And be it further enacted*, That in case appeal shall be made to the said chief judge, or to either of the said assistant judges, the Commissioner of Patents shall pay to such chief judge, or assistant judge, the sum of twenty-five dollars, required to be paid by the appellant into the Patent Office by the eleventh section of said act, on said appeal.

SEC. 3. [Repeals a former section relating to a fee to the justice.]

Approved August 30, 1852.

PATENT LAW OF 1861.

COMMISSIONER TO ISSUE SUBPŒNAS, ETC.

Be it enacted, etc., That the Commissioner of Patents may establish rules for taking affidavits and depositions required in cases pending in the Patent Office, and such affidavits and depositions may be taken before any justice of the peace or other officer authorized by law to take depositions to be used in the courts of the United States, or in the State courts of any State where such officer shall reside; and in any contested case pending in the Patent Office it shall be lawful for the clerk of any court of the United States for any district or Territory, and he is hereby required, upon the application of any party to such contested case, or the agent or attorney of such party, to issue subpœnas for any witnesses residing or being within the said district or Territory, commanding such witnesses to appear and testify before any justice of the peace, or other officer as aforesaid, residing within the said district or Territory, at any time and place in the subpœna to be stated; and if any witness, after being duly served with such subpœna, shall refuse or neglect to appear, or, after appearing, shall refuse to testify, (not being privileged from giving testimony,) such refusal or neglect being proved to the satisfaction of any judge of the court whose clerk shall have issued such subpœna, said judge may thereupon proceed to enforce obedience to the process, or to punish the disobedience in like manner as any court of the United States may do in case of disobedience to process of *subpœna ad testificandum* issued by such court; and witnesses in such cases shall be allowed the same compensation as is allowed to witnesses attending the courts of the United States: *Provided*, That no witness shall be required to attend at any place more than forty miles from the place where the subpœna shall be served upon him to give a deposition under this law: *Provided also*, That no witness shall be deemed guilty of contempt for refusing to disclose any secret invention made or owned by him: *And provided, further*, That no witness shall be deemed guilty of contempt for disobeying any subpœna directed to him by virtue of this act, unless his fees for going to, returning

from, and one day's attendance at the place of examination shall be paid or tendered him at the time of the service of the subpœna.

EXAMINERS-IN-CHIEF.

SEC. 2. *And be it further enacted*, That for the purpose of securing greater uniformity of action in the grant and refusal of letters patent, there shall be appointed by the President, by and with the advice and consent of the Senate, three examiners-in-chief, at an annual salary of three thousand dollars each, to be composed of persons of competent legal knowledge and scientific ability, whose duty it shall be, on the written petition of the applicant for that purpose being filed, to revise and determine upon the validity of decisions made by examiners when adverse to the grant of letters patent; and also to revise and determine in like manner upon the validity of the decisions of examiners in interference cases, and when required by the Commissioner in applications for the extension of patents, and to perform such other duties as may be assigned to them by the Commissioner; that from their decisions appeals may be taken to the Commissioner of Patents in person, upon payment of the fee hereinafter prescribed; that the said examiners-in-chief shall be governed in their action by the rules to be prescribed by the Commissioner of Patents.

SEC. 3. *And be it further enacted.* That no appeal shall be allowed to the examiners-in-chief from the decisions of the primary examiners, except in interference cases, until after the application shall have been twice rejected. * * *

SEC. 4. [Relates to salaries.]

RETURN OF MODELS.

SEC. 5. *And be it further enacted*, That the Commissioner of Patents is authorized to restore to the respective applicants, or when not removed by them, to otherwise dispose of such of the models belonging to rejected applications as he shall not think necessary to be preserved. The same authority is also given in relation to all models accompanying applications for designs. He is further authorized to

dispense in future with models of designs when the design can be sufficiently represented by a drawing.

SEC. 6. [Repeals agencies for models.]

SEC. 7. [Relates to clerks.]

PAPERS MUST BE PROPERLY PREPARED.

SEC. 8. *And be it further enacted*, That the Commissioner may require all papers filed in the Patent Office, if not correctly, legibly, and clearly written, to be printed at the cost of the parties filing such papers; and for gross misconduct he may refuse to recognize any person as a patent agent, either generally or in any particular case; but the reasons of the Commissioner for such refusal shall be duly recorded, and subject to the approval of the President of the United States.

NO MONEY RETURNED ON REJECTED CASES.

SEC. 9. *And be it further enacted*, That no money paid as a fee on any application for a patent after the passage of this act shall be withdrawn or refunded; nor shall the fee paid on filing a caveat be considered as part of the sum required to be paid on filing a subsequent application for a patent for the same invention.

That the three months' notice given to any caveator in pursuance of the requirements of the twelfth section of the act of July fourth, eighteen hundred and thirty-six, shall be computed from the day on which such notice is deposited in the post-office at Washington, with the regular time for the transmission of the same added thereto, which time shall be indorsed on the notice; and that so much of the thirteenth section of the act of Congress, approved July fourth, eighteen hundred and thirty-six, as authorizes the annexing to letters patent of the description and specification of additional improvements, is hereby repealed, and in all cases where additional improvements would now be admissible independent patents must be applied for.

SCHEDULE OF OFFICIAL FEES.

SEC. 10. *And be it further enacted*, That all laws now in force fixing the rates of the Patent Office fees to be paid,

and discriminating between the inhabitants of the United States and those of other countries which shall not discriminate against the inhabitants of the United States, are hereby repealed, and in their stead the following rates are established:

On filing each caveat, ten dollars.

On filing each original application for a patent, except for a design, fifteen dollars.

On issuing each original patent, twenty dollars.

On every appeal from the examiners-in-chief to the Commissioner, twenty dollars.

On every application for the reïssue of a patent, thirty dollars.

On every application for the extension of a patent, fifty dollars; and fifty dollars, in addition, on the granting of every extension.

On filing each disclaimer, ten dollars.

For certified copies of patents and other papers, ten cents per hundred words.

For recording every assignment, agreement, power of attorney, and other papers, of three hundred words or under, one dollar.

For recording every assignment and other papers over three hundred and under one thousand words, two dollars.

For recording every assignment or other writing, if over one thousand words, three dollars.

For copies of drawings, the reasonable cost of making the same.

PATENTS FOR DESIGNS.

SEC. 11. *And be it further enacted*, That any citizen or citizens, or alien or aliens, having resided one year in the United States, and taken the oath of his or their intention to become a citizen or citizens, who by his, her, or their own industry, genius, efforts, and expense, may have invented or produced any new and original design for a manufacture, whether of metal or other material or materials, and original design for a bust, statue, or bas-relief, or composition in alto or basso relievo, or any new and original impression or ornament, or to be placed on any article of

manufacture, the same being formed in marble or other material, or any new and useful pattern, or print, or picture, to be either worked into or worked on, or printed or painted or cast, or otherwise fixed on any article of manufacture, or any new and original shape or configuration of any article of manufacture, not known or used by others before his, her, or their invention or production thereof, and prior to the time of his, her, or their application for a patent therefor, and who shall desire to obtain an exclusive property or right therein to make, use, and sell, and vend the same, or copies of the same to others, by them to be made, used, and sold, may make application in writing to the Commissioner of Patents, expressing such desire; and the Commissioner, on due proceedings had, may grant a patent therefor, as in the case now of application for a patent, for for the term of three and one half years, or for the term of seven years, or for the term of fourteen years, as the said applicant may elect in his application: *Provided*, That the fee to be paid in such application shall be for the term of three years and six months, ten dollars; for seven years, fifteen dollars; and for fourteen years, thirty dollars: *And provided*, That the patentees of designs under this act shall be entitled to the extension of their respective patents, for the term of seven years from the day on which said patents shall expire, upon the same terms and restrictions as are now provided for the extension of letters patent.

APPLICATIONS MUST BE COMPLETED WITHIN TWO YEARS.

SEC. 12. *And be it further enacted*, That all applications for patents shall be completed and prepared for examination within two years after the filing of the petition, and in default thereof they shall be regarded as abandoned by the parties thereto, unless it be shown, to the satisfaction of the Commissioner of Patents, that such delay was unavoidable; and all applications now pending shall be treated as if filed after the passage of this act; and all applications for the extension of patents shall be filed at least ninety days before the expiration thereof, and notice of the day

set for the hearing of the case shall be published, as now required by law, for at least sixty days.

PATENTED ARTICLES TO BE STAMPED.

SEC. 13. *And be it further enacted*, That in all cases where an article is made or vended by any person under the protection of letters patent, it shall be the duty of such person to give sufficient notice to the public that said article is so patented, either by fixing thereon the word patented, together with the day and year the patent was granted, or when, from the character of the article patented, that may be impracticable, by enveloping one or more of the said articles, and affixing a label to the package, or otherwise attaching thereto a label, on which the notice, with the date, is printed; on failure of which, in any suit for the infringement of letters patent by the party failing so to mark the article the right to which is infringed upon, no damage shall be recovered by the plaintiff, except on proof that the defendant was duly notified of the infringement, and continued after such notice to make or vend the article patented. * * *

PATENTS MAY BE PRINTED.

SEC. 14. *And be it further enacted*, That the Commissioner of Patents be, and he is hereby, authorized to print, or in his discretion to cause to be printed, ten copies of the description and claims of all patents which may hereafter be granted, and ten copies of the drawings of the same, when drawings shall accompany the patents: *Provided*, The cost of printing the text of said descriptions and claims shall not exceed, exclusive of stationery, the sum of two cents per hundred words for each of said copies, and the cost of the drawing shall not exceed fifty cents per copy; one copy of the above number shall be printed on parchment, to be affixed to the letters patent; the work shall be under the direction, and subject to the approval, of the Commissioner of Patents, and the expense of the said copies shall be paid for out of the patent fund.

SEC. 15. *And be it further enacted*, That printed copies

of the letters patent of the United States, with the seal of the Patent Office affixed thereto, and certified and signed by the Commissioner of Patents, shall be legal evidence of the contents of said letters patents in all cases.

PATENTS GRANTED FOR SEVENTEEN YEARS. EXTENSIONS PROHIBITED.

SEC. 16. *And be it further enacted*, That all patents hereafter granted shall remain in force for the term of seventeen years from the date of issue; and all extension of such patents is hereby prohibited.

SEC. 17. *And be it further enacted*, That all acts and parts of acts heretofore passed, which are inconsistent with the provisions of this act, be, and the same are hereby, repealed.

Approved March 2, 1861.

PATENT LAW OF 1863.

SEC. 1. [Repeals the renewal of oath.]

SEC. 2. [Relates to clerks, etc.]

DATING OF PATENTS.

SEC. 3. *And be it further enacted*, That every patent shall be dated as of a day not later than six months after the time at which it was passed and allowed, and notice thereof sent to the applicant or his agent. And if the final fee for such patent be not paid within the said six months the patent shall be withheld, and the invention therein described shall become public property as against the applicant therefor:* *Provided*, That, in all cases where patents have been allowed previous to the passage of this act, the said six months shall be reckoned from the date of such passage.

Approved March 3, 1863.

* Modified. See law of 1865.

PATENT LAW OF 1865

FORFEITED APPLICATIONS MAY BE REVIVED.

Be it enacted, That any person having an interest in an invention, whether as inventor or assignee, for which a patent was ordered to issue upon the payment of the final fee, as provided in section three of an act approved March third, eighteen hundred and sixty-three, but who failed to make payment of the final fee, as provided in said act, shall have the right to make an application for a patent for his invention, the same as in the case of an original application, provided such application be made within two years after the date of the allowance of the original application: *Provided*, that nothing herein shall be so construed as to hold responsible in damages any persons who have manufactured or used any article or thing for which a patent aforesaid was ordered to issue.

This act shall apply to all cases now in the Patent Office, and also to such as shall hereafter be filed; and all acts or parts of acts inconsistent with this act are hereby repealed.

Approved, March 3, 1865.

PATENT LAW OF 1866.

APPEALS TO THE EXAMINERS-IN-CHIEF.

Be it enacted, That upon appealing for the first time from the decision of the primary examiner to the examiners-in-chief in the Patent Office, the appellant shall pay a fee of ten dollars into the Patent Office to the credit of the Patent fund; and no appeal from the primary examiner to the examiners-in-chief shall hereafter be allowed until the appellant shall pay said fee.

Approved, June 27, 1866.

The yearly official Reports of the Patent Office are distributed gratuitously to the public, on application to members of Congress. The Reports are not sold by the government.

[From The Scientific American.]

RELATING TO PATENTS.

IT may be well for parties who are interested in new inventions to remember that our firm of Munn & Co. have taken out far more patents, and have, therefore, had much greater experience in the profession, than any other agency in the world. Those who confide their business to us may therefore rely upon having it done in the best manner on the most moderate terms.

In addition to these advantages, we make it a general rule to assist the interest of our clients by giving publicity in the form of editorial notices, of all the new and meritorious inventions that are patented through our agency. The fact that we have carefully studied these improvements during the process of preparing the patent papers, enables us to speak knowingly in regard to their best features. The publicity thus given to inventions, owing to the immense circulation of THE SCIENTIFIC AMERICAN among intelligent readers, is often of the utmost benefit to patentees. In some cases it has engaged the active coöperation of enterprising capitalists and manufacturers, in patents which otherwise would have remained dead, and has resulted in the most important pecuniary advantages to inventors and patentees, as hundreds of them are ready to testify; although the sum total of our charges for preparing their patent papers has rarely exceeded the small amount of twenty-five dollars. Whatever carping, jealous, or envious persons, or little agents, may say to the contrary, we are justified in affirming that all who really wish to promote their own interests will do well to employ THE SCIENTIFIC AMERICAN PATENT AGENCY.

PROPERTIES OF CHARCOAL.

Although charcoal is so combustible, it is, in some respects a very unchangeable substance, resisting the action of a great variety of other substances upon it. Hence posts are often charred before being put into the ground. Grain has been found in the excavations at Herculaneum, which was charred at the time of the destruction of that city, eighteen hundred years ago, and yet the shape is perfectly preserved, so that you can distinguish between the different kinds of grain. While charcoal is itself so unchangeable, it preserves other substances from change. Hence meat and vegetables are packed in charcoal for long voyages, and the water is kept in casks which are charred on the inside. Tainted meat can be made sweet by being covered with it. Foul and stagnant water can be deprived of its bad taste by being filtered through it. Charcoal is a great decolorizer. Ale and porter filtered through it are deprived of their color, and sugar-refiners decolorize their brown syrups by means of charcoal, and thus make white sugar. Animal charcoal, or bone-black, is the best for such purposes, although only one-tenth of it is really charcoal, the other nine-tenths being the mineral portion of the bone.

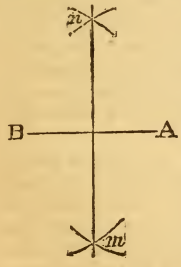
Charcoal will absorb, of some gases, from eighty to ninety times its own bulk. As every point of its surface is a point of attraction, it is supposed to account for the enormous accumulation of gases in the spaces of the charcoal. But this accounts for it only in part. There must be some peculiar power in the charcoal to change, in some way, the condition of a gas of which it absorbs ninety times its own bulk.—*Hooker.*

SUBSTITUTE FOR THE CRANK.

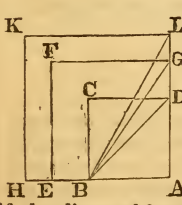
Various devices supposed to have advantages over the common crank, have been invented. Our diagram shows one of these forms, which has been re-invented many times, by different inventors. A grooved wheel is employed, and in the groove are two slides, attached respectively, by pivots, to the connecting rod of a piston rod. The reciprocating movement of the piston rod acting upon the connecting rod, causes the rotation of the wheel.

PRACTICAL GEOMETRY.

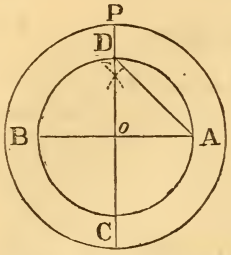
A KNOWLEDGE of geometry, both practical and theoretical, is of importance to mechanics and inventors. It is promotive of truth and patience in mental habits, and leads to the exercise of nicety and exactness in the execution of mechanical labors. With a pair of dividers, a rule and pencil, any person may speedily acquire a considerable knowledge of practical geometry. We subjoin a few simple and generally useful problems for practice, in the hope of thus interesting some of our readers in the subject, so that they will continue the study. Complete works on geometry can be had at the book-stores.



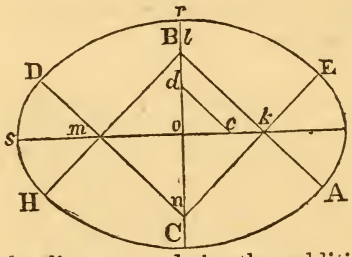
Problem 1.—To divide a line into equal parts.—To draw a line perpendicular to another: With a pair of dividers from the extremities of the line A B as centres, with any distance exceeding the point where the line is to be intersected, describe arcs cutting each other as *m n*; then a line drawn through *m n* will divide the line A B equally, and will also be perpendicular thereto.



Problem 2.—To find the side of a square that shall be any number of times the area of a given square: Let A B C D be the given square; then will the diagonal B D be the side of a square A E F G, double in area to the given square A B C D; the diagonal B D is equal to the line A G; if the diagonal be drawn from B to G, it will be the side of a square A H K L, three times the area of the square A B C D; the diagonal B L will equal the size of a square four times the area of the square A B C D, etc.



Problem 3.—To find the diameter of a circle that shall be any number of times the area of a given circle: Let A B C D be the given circle; draw the two diameters A B and C D at right angles to each other, and the cord A D will be the radius of the circle *o* P, twice the area of the given circle nearly; and half the cord will be the radius of a circle that will contain half the area, etc.



Problem 4.—To describe an ellipsis, the transverse and conjugate diameters being given: From *o*, as a centre, with the difference of the transverse and conjugate semi-diameters, set off *o c* and *o d*; draw the diagonal *c d*, and continue the line *o c* to *k*, by the addition of half the diagonal *c d*, then will the distance *o k* be the radius of the centres that will describe the ellipsis; draw the lines A B, C D, C E, and B H, cutting the semi-diameters of the ellipsis in the centres *k* B *m n*; then with the radius *m s*, and with *k*, and *m* as centres, describe the arcs D H and A E; also, with the radius *n r*, and with *n* and B as centres, describe the arcs E H and A H, and the figure A E D H will be the ellipsis required.

THE "SCIENTIFIC AMERICAN."—"It is hardly necessary for us to speak of its merits to those who are thoroughly posted up in the improvements of the age; but the general reading public may not be so well aware that it contains the finest engravings of all the late inventions—the new monitors, army and navy weapons, vessels, forts, machinery of all kinds, military and civil, mechanical and agricultural—with essays from the most distinguished scholars upon prac-

tical philosophy, chemistry, and engineering. It is indispensable to every inventor. It is useful for every family and housewife. In short, it is the best scientific and mechanical journal in the world, and we cannot see how any chemist, architect, engineer, farmer, or mechanic can do without it. MUNN & Co., Publishers, 37 Park Row, New York."—*Cass County Republican.*

MECHANICAL MOVEMENTS.

IN the construction of models, or machinery, the skillful mechanic and inventor will study to avoid clumsiness in the arrangement of parts, and will naturally take pride in selecting, as far as possible, the simplest and best forms of mechanical movements.

To this end, we have thought that nothing could be more suggestive or useful than a comprehensive exhibition of many of the best mechanical forms already known.

After much labor and expense, we have brought together, condensed and engraved expressly for this work, one of the most extensive series of mechanical movements ever before published.

Here the mechanic may find at a glance the movement suited for his purpose, and may see the separate parts best adapted to any special combination of mechanism.

As these engravings are not readily to be found elsewhere, we recommend the careful preservation of this book.

DESCRIPTION OF THE MECHANICAL MOVEMENTS BY NUMBERS.

1. Shaft coupling. 2. Claw coupling. 3, 4. Lever couplings. On the driving shaft, a disk with spurs is mounted, and to the shaft to be driven a lever is hinged. By causing this lever to catch in the spurs of the disk, the coupling is effected. 5. Knee or rose coupling, of which 26 is a side view.

6. Universal joint. 7, 8. Disk and spur coupling. 9. Prong and spur lever coupling.

10. Fast and loose pulley. 11. Sliding gear, the journal boxes of one of the wheels being moveable. 12. Friction clutch. By tightening or releasing a steel band, encircling a pulley on the shaft, the machinery is thrown in or out of

gear. 13, 14. Shoe and lever brakes. 15, 16. Change of motion by sheaves. 17. Spiral flanged shaft. 18. Connected with the rod are pawl links, catching into ratchet-teeth in the wheel to which rotary motion is to be imparted. When the rod moves in one direction, one of the pawls acts; and when the rod moves in the opposite direction, the other pawl acts in the same direction as the first. 19. The reciprocating motion of a rod is converted into rotary motion of the fly-wheel by a weight suspended from a cord, which passes over a small pulley that connects with a treadle, from which the motion is transmitted to the fly-wheel.

20. "Flying horse," used in fairs for amusement. By pulling the cords radiating from the crank, the persons occupying the seats or horses on the ends of the arms are enabled to keep the apparatus in motion. 21, 22. Bow string arrangements, to connect reciprocating into rotary motion. 23. Same purpose by differential screw. 24. The same by double rack and wheels. 25. Coupling for square shafts. 26. Side view of Fig. 5. 27. Sliding spur pulley coupling. 28. Lever with bearing roller to tighten pulley bands. 29. Chain wheel.

30. Reciprocating rectilinear into reciprocating rotary motion by two racks and cog wheel. 31. Oblique toothed wheels. 32. Worm and worm wheel. 33, 34. Claw coupling with hinged lever. 35, 36. Disk couplings, with lugs and cavities. 37. Disk coupling with screw bolts. 38, 39, 40. Shaft couplings.

41. Face view of Fig. 12. 42. Friction cones. 43. Friction pullies. 44. Self-releasing coupling. Disks with oblique teeth. If the resistance to the driven shaft increases beyond a certain point, the disks separate. 45. Hoisting blocks. 46. Elbow crank, for changing motion. 47. Reciprocating into rotary motion by zig-zag groove on cylinder. 48. Another form of Fig. 29. 49. Reciprocating into a rotary motion.

50. Same purpose. 51. Same purpose, by double rack and two ratchet pinions. When the double rack moves in one direction, one pinion is rigid with the shaft; when the rack moves in the opposite direction, the other pinion is rigid, and a continuous rotary motion is imparted to the fly-wheel shaft. 52. Reciprocating into oscillating. 53. Rotary into

reciprocating. By the action of the wheel pins, the carriage is moved in one direction, and by the action of said pins on an elbow-lever, it is moved in the opposite direction. 54. Stamp rod and lifting cam. 55. For giving reciprocating motion to rack. 56. Same motion to a bar with slot, by means of an eccentric pin projecting from a revolving disk, and catching in the slot. 57. Walking beam and fly-wheel. 58. Reciprocating motion to pump or other rod by means of eccentric disk and friction rollers. See 81 and 104. 59. Hoisting crane.

60. Friction gears. See 43. 61. Rotary into reciprocating by rising and falling pinion acting on endless rack. 62. By the revolving cam, a rising and falling or a reciprocating rectilinear motion is imparted to a drum. 63. Reciprocating motion to a frame by means of endless rack and pinion. 64. Reciprocating rectilinear motion to a toothed rack by a toothed segment on a lever-arm, which is subjected to the action of a weight, and of an eccentric wrist-pin, projecting from a revolving disk. 65. Reciprocating motion to a rod. The wheels are of different diameters, and consequently the rod has to rise and fall as the wheels revolve. (See 110.) 66. Cam and elbow lever. 67. Rod reciprocates by means of cam. 68. Revolving into reciprocating motion, by an endless segmental rack and pinion, the axle of which revolves and slides in a slot toward and from the rack. This rack is secured to a disk, and a rope round said disk extends to the body to which a reciprocating motion is to be imparted. 69. Elliptic gears.

70. Bevel gear. 71. Worm and worm wheel. 72. Transmitting motion from one axle to another, with three different velocities, by means of toothed segments of unequal diameters. 73. Continuous revolving into reciprocating, by a cam-disk acting on an oscillating lever. 74. Intermittent revolving motion to a shaft with two pinions, and segment gear wheel on end of shaft. 75. Oscillating lever, carrying pawls which engage teeth in the edges of a bar to which rectilinear motion is imparted. 76. Oscillating lever, connects by a link with a rod to which a rectilinear motion is imparted. 77. Oscillating lever and pawls, which gear in the ratchet-wheel. 78. Common treadle. 79. Describing on a revolving cylinder a spiral line of a certain given pitch.

which depends upon the comparative sizes of the pinion and bevel-wheels.

80. Marking a spiral line, the graver moved by a screw. 81. (See Fig. 58.) 82. Plunger and rods. 83. Cross head and rods. 84. Reciprocating rod guided by friction rollers. 85. Revolving into reciprocating motion, by means of roller-arms, extending from a revolving shaft, and acting on lugs projecting from a reciprocating frame. 86. Crank motion. 87. Reciprocating motion by toothed wheel and spring bar. 88. The shaft carries a tapper, which catches against a hook hinged to the drum, so as to carry said drum along and raise the weight on the rope. When the tappet has reached its highest position, the hook strikes a pin, the hook disengages from the tappet, and the weight drops. 89. Reciprocating motion to a rod by means of a groove in an oblique ring secured to a revolving shaft.

90. Double crank. 91. Cam groove in a drum, to produce reciprocating motion. 92. Belts and pulleys. 93. Pulleys, belts, and internal gear. 94. As the rod moves up and down, the teeth of the cog-wheel come in contact with a pawl, and an intermittent rotary motion is imparted to said wheel. 95. By turning the horizontal axles with different velocities, the middle wheel is caused to revolve with the mean velocity. 96. Oscillating lever and cam groove in a disk. 97. Lazy tongs. 98. Oscillating segment and belt over pulleys. 99. Converting oscillating into a reciprocating motion by a cam-slot in the end of the oscillating lever which catches over a pin projecting from one of the sides of a parallelogram which is connected to the rod to which reciprocating motion is imparted.

100. Oscillating motion of a beam into rotary motion. 101. Motion of a treadle into rotary motion. 102. Double-acting beam. 103. Single-acting beam. 104. (See Figures 58 and 81.) 105. Device to steady a piston by a slotted guide-piece, operated by an eccentric on the driving-shaft. 106. Rod operated by two toothed segments. 107. Two cog-wheels of equal diameter, provided with a crank of the same length, and connected by links with a cross-bar to which the piston-rod is secured. 108. Device for a rectilinear motion of a piston-rod based on the hypocycloidal motion of a pinion in a stationary wheel with internal gear.

If the diameter of the pinion is exactly equal to one-half the diameter of the internal gear, the hypocycloid becomes a right line. 109. Same purpose as 56.

110. Action similar to 65. 111. Revolving motion by a circular sliding pinion gearing in an elliptical cog-wheel. 112. Similar to 96. 113. Carpenter's clamp. The jaws turn on their pivot-screws, and clamp the board. 114. An irregular vibratory motion is given to the arm carrying the wheel A, by the rotation of the pinion B. 115. Intermittent rotary motion of the pinion-shaft, by the continuous rotary motion of the large wheel. The part of the pinion shown next the wheel is cut on the same curve as the plain portion of the circumference, and, therefore, serves as a lock whilst the wheel makes a part of a revolution, and until the pin upon the wheel strikes the guide-piece upon the pinion, when the pinion-shaft commences another revolution. 116. Stop-motion used in watches to limit the number of revolutions in winding up. The convex curved part, a, b, of the wheel B, serving as the stop. 117. Several wheels, by connecting rods, driven from one pulley. 118. Intermittent circular motion is imparted to the toothed wheel by vibrating the arm B. When the arm, B, is lifted, the pawl is raised from between the teeth of the wheel, and traveling backward over the circumference again, drops between two teeth on lowering the arm, and draws with it the wheel. 119. Reciprocating rectilinear motion is given to the bar by the continuous motion of the cam. The cam is of equal diameter in every direction measured across its center.

120. Mechanism for revolving the cylinder in Colt's fire-arms. When the hammer is drawn back the dog, a, attached to the tumbler, acts on the ratchet, b, on the back of the cylinder, and is held up to the ratchet by a spring, c. 121. Alternate increasing and diminishing motion, by means of eccentric toothed wheel and toothed cylinder. 122. Oscillating or pendulum engine. The cylinder swings between trunnions like a pendulum. The piston-rod connects directly with crank. 123. Intermittent rotary motion. The small wheel is driven, and the friction rollers on its studs move the larger wheel by working against the faces of oblique grooves or projections across the face thereof. 124. Longitudinal and rotary motion of the rod is produced by

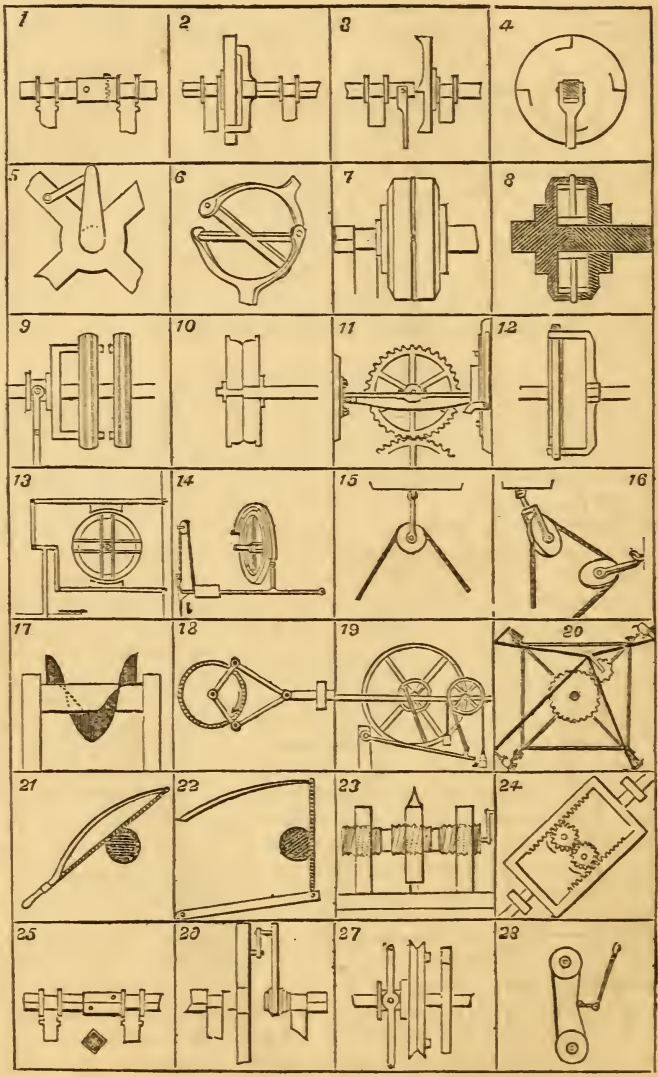
its arrangement between two rotating rollers, the axles of which are oblique to each other. 125. Friction indicator of Roberts. Upon the periphery of the belt-pulley a loaded carriage is placed, its tongue connected with an indicator. With a given load the indicating pointer remains in a given position, no matter what velocity is imparted to the pulley. When the load is changed the indicator changes, thus proving that the friction of wheels is in proportion to load, not velocity. 126. Circular intermittent rectilinear reciprocating motion. Used on sewing-machines for driving the shuttle; also on three-revolution cylinder printing-presses. 127. Continuous circular into intermittent circular motion. The cam is the driver. 128. Sewing-machine, four-motion feed. The bar, B, carries the feeding-points or spurs, and is pivoted to slide, A. B is lifted by a radial projection on cam C, which at the same time also carries A and B forward. A spring produces the return stroke, and the bar B, drops by gravity. 129. Patent crank motion, to obviate dead centers. Pressure on the treadle moves the slotted slide, A, forward until the wrist passes the center, when the spring, B, forces the slide against the stops until next forward movement.

130. Four-way cock. 131. One stroke of the piston gives a complete revolution to the crank. 132. Rectilinear motion of variable velocity, is given to the vertical bar by rotation of the shaft of the curved arm. 133. Pantagraph for copying, enlarging, and reducing plans, etc. C, fixed point. B, ivory tracing point. A, pencil trace, the lines to be copied with, and B, the pencil, will re-produce it double size. Shift the slide to which C is attached, also the pencil slide, and size of the copy will be varied. 134. Ball and socket joint for tubing. 135. Numerical registering device. The teeth of the worm shaft gear with a pair of worm-wheels of equal diameter, one having one tooth more than the other. If the first wheel has 100 teeth and the second 101, the pointers will indicate respectively 101 and 10.100 revolutions. 136. Montgolfier's hydraulic ram. The right hand valve being kept open by a weight or spring, the current flowing through the pipe in the direction of the arrow, escapes thereby. When the pressure of the water current overcomes the weight of the right valve, the momentum of the water opens the other valve, and the water passes into the air-chamber. On

equilibrium taking place, the left valve shuts and the right valve opens. By this alternate action of the valves, water is raised into the air-chamber at every stroke. 137. Rotary engine. Shaft, B, and hub, C, are arranged eccentric to the case. Sliding radial pistons, a, a, move in and out of hub, C. The pistons slide through rolling packings in the hub, C. 138. Quadrant engine. Two single-acting pistons, B, B, connect with crank, D. Steam is admitted to act on the outer sides of the pistons alternately through valve a, and the exhaust is between the pistons. 139. Circular into rectilinear motion. The scolloped wheel communicates motion to the horizontal oscillating rod, and imparts rectilinear movement to the upright bar. 140. Rotary motion transmitted by rolling contact between two obliquely arranged shafts.

MULTUM IN PARVO.

We have some queer correspondents: One writes to know if we will not be so good as to send a messenger to an address which he gives, up town—distance two and a half miles from our office—to make certain inquiries for him. It would require one and a half hours time to do the errand, and not a stamp inclosed. Another wants us to write a letter and tell him where to get a combined thermometer and barometer. Another, "will you be good enough to give me the names and addresses of several of the makers of the best brick machines;" another wants water wheels; another threshing machines; each writer desires our written opinion as to which is the best device, with our reasons, and not one is thoughtful enough to inclose a fee, or reflect that to answer his request will consume considerable of our time. Another party wishes us to write to him the recipe for making ornaments out of coal tar, where he can buy the mixture ready for use, and how much chequer-men will sell for in the New York market. For this information he sends us the generous sum of three cents in postage stamps. Mr. C. wants us to tell him of some valuable invention, of which he can buy the patent cheap, that would be suitable for him to take to sell, on his travels out West, by towns, counties, etc., three cents inclosed. Others want us to put them in communication with some person who will purchase an interest in their inventions, or manufacture for them, or furnish this or that personal information, our reply to be printed in the Scientific American. We are at all times happy to serve our correspondents, but if replies to purely personal errands are expected, a small fee, say from one to five dollars, should be sent.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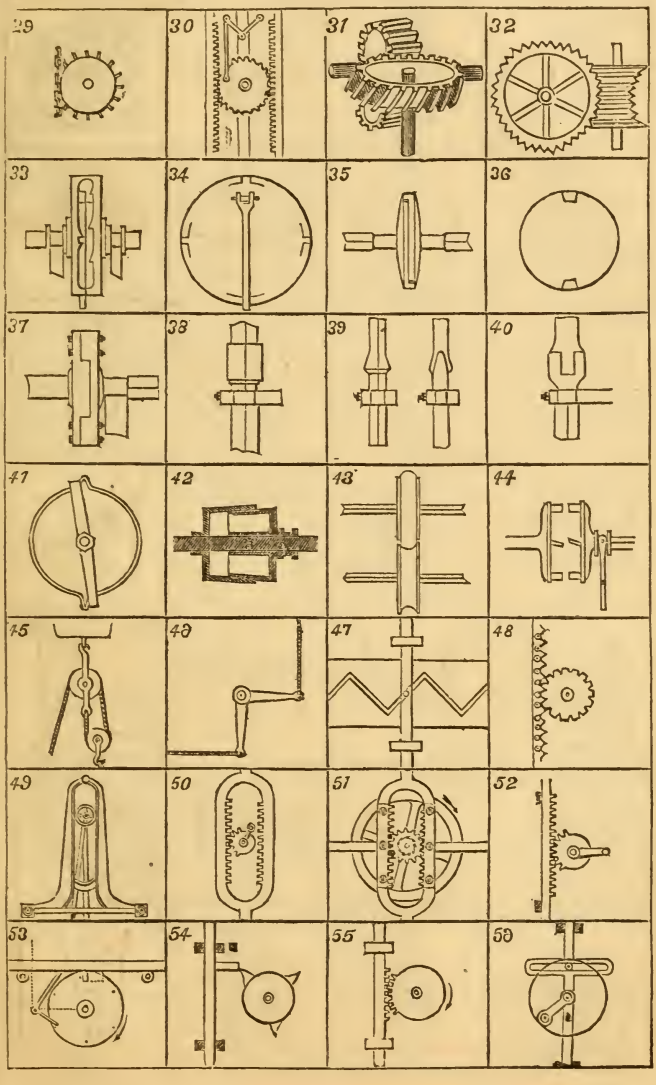
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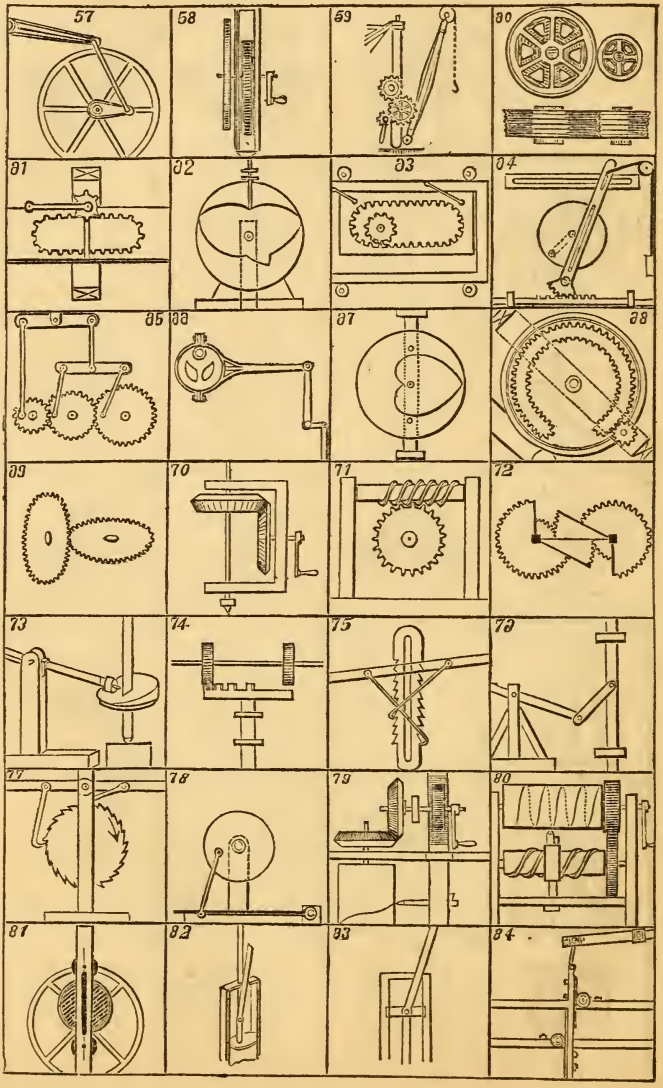
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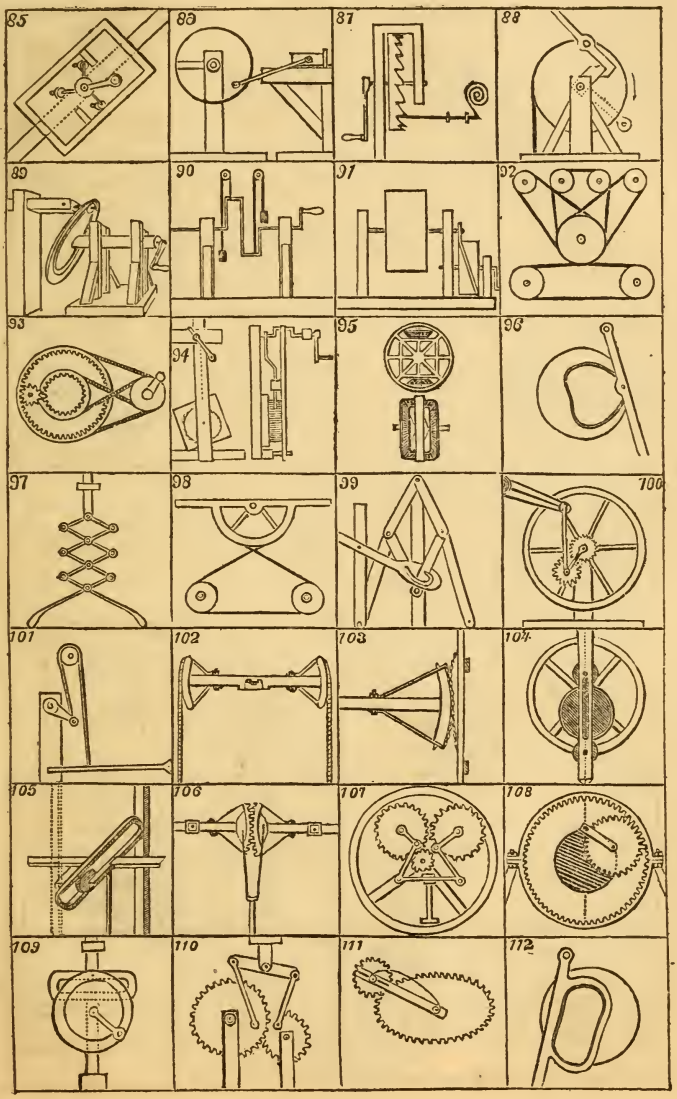
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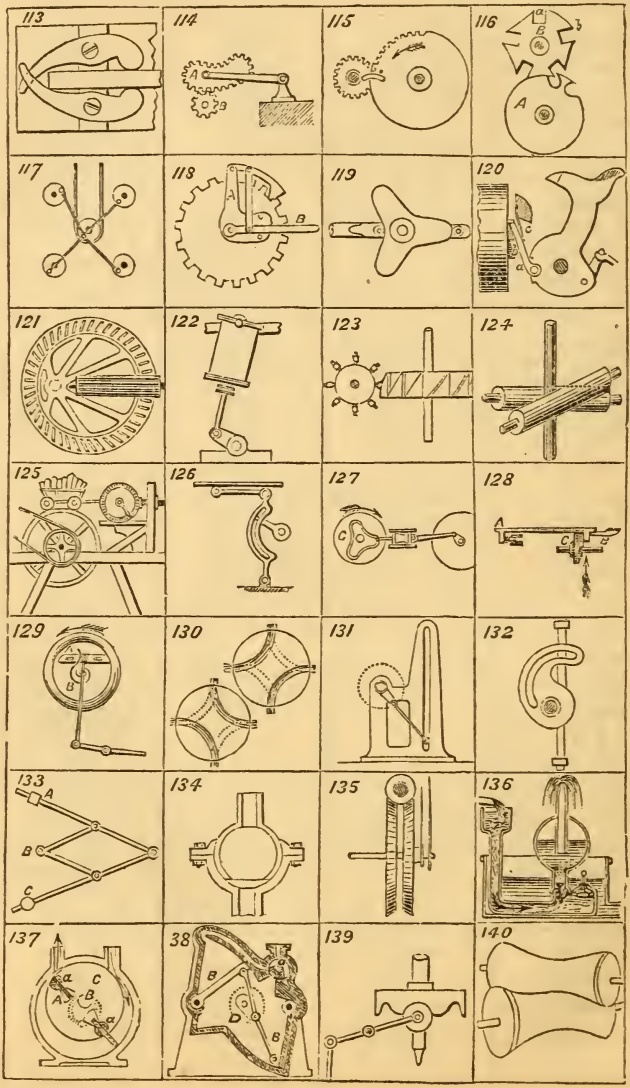
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WILL IT PAY?

On page 5, readers are informed that we are always happy to give them our opinion as to the novelty of their inventions, *without charge*. But some persons, when they send for such information, add many other inquiries, difficult to answer, and not included in our gratuitous invitation; as for example: "What is it worth? Who will buy? Will it pay? Does it infringe? Does it conflict with B's patent? If you will guarantee that it does not infringe, I will apply for a patent," etc.

It is impossible for us to answer all of these questions satisfactorily, but in special cases we might write out a reply if a fee were sent to compensate for our time. The following hints, however, may prove useful as a sort of general answer.

"What is it worth? Who will buy?" If a patent is refused, and cannot be obtained, the device is worth nothing, and no one will buy. Therefore the first thing to be considered, the first step to be taken, is to *obtain the Patent*. Do not count your chickens, nor anxiously seek a market for them, nor ask anybody to guarantee or insure their lives, before they are hatched.

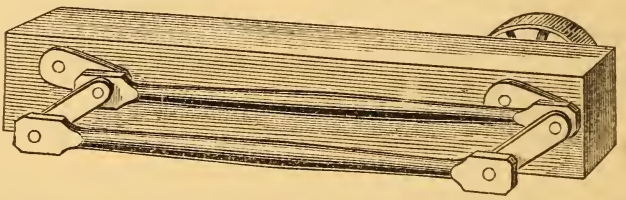
"Will it pay?" As a general rule, every patentable improvement will more than repay the small cost of taking out the patent. The sale of a single machine, or of a single right of use, will often bring back more than the whole outlay for the patent. The extent of profit frequently depends upon the business capacity of the inventor, or his agent. One man will make a fortune from an unpromising improvement, while another, possessing a brilliant invention, will realize little or nothing, owing to idleness and incompetence. [See remarks, page 42.]

"Does it infringe?" To answer this in each individual case, requires the special search mentioned at page 16. Infringement consists in the use, sale, or manufacture of the thing patented. It is not an infringement to take out or hold a patent for an improvement upon any other patent. It is not an infringement to sell rights under any patent, whether town, county or state rights, or licenses. The actual manufacture, sale, or use of an *article* may infringe; but the sale or purchase of *patent rights* is not infringement.

All good improvements are worth patenting, even if their use infringes a prior patent. Many an infringing device is worth more than the patent with which it conflicts. Patentees of conflicting inventions can usually make satisfactory arrangements with the owners of the prior patents; it is obviously to the interest of prior patentees to have their patents used as extensively as possible. The princely revenue of Howe, the inventor of the sewing machine, said to be five hundred thousand dollars annually, is derived from infringing patentees, who pay him a small royalty on each machine. The net profits divided among the owners of one of these infringing patents,—the celebrated Wheeler and Wilson—is reported to be more than one million dollars a year. We might give hundreds of analogous examples.

SUBSTITUTE FOR BELTS AND GEARS.

The object of this device is to transmit motion from one shaft to another, without the use of belt or gear wheels, both of which are in some instances objectionable.



Continuous rotary motion of the pulley shaft, is imparted to the secondary shaft through the connecting rods

STEAM PRESSURE AND TEMPERATURE.

Pressure in lbs. pr sq. in.	Correspond'g Temperature, Fahrenheit.	Pressure in lbs. per sq. in.	Correspond'g Temperature. Fahrenheit.	Pressure in lbs. per sq. in.	Correspond'g Temperature, Fahrenheit.
10	192.4	65	301.3	140	357.9
15	212.8	70	306.4	150	363.4
20	228.5	75	311.2	160	368.7
25	241.0	80	315.8	170	373.6
30	251.6	85	320.1	180	378.4
35	260.9	90	324.3	190	382.9
40	269.1	95	328.2	200	387.3
45	276.4	100	332.0	210	391.5
50	283.2	110	339.2	220	395.5
55	289.3	120	345.8	230	399.4
60	295.6	130	352.1	240	403.1

ABSTRACT

OF THE

POPULATION OF THE UNITED STATES OF AMERICA.

CENSUS OF 1860.

MAINE.—Area, 31,766 square miles.

Androsc'n.	29,725	Hancock ..	37,758	Lincoln....	27,854
Aroostook.	22,479	Kennebec..	55,655	Oxford....	36,698
Cumberl'd.	75,592	Knox.....	32,716	Penobscot.	72,731
Franklin..	29,403				

Piscataq's.	15,032	Waldo	38,447
Sagadah'k.	21,790	Wash'gton	42,535
Somerset..	36,754	York.....	62,107
Total.....			628,276

NEW HAMPSHIRE.—Area, 9,280 square miles.

Belknap...	18,548	Cheshire..	27,434	Grafton ...	42,259
Carroll....	20,464	Coos.... ..	13,162	Hillsboro'.	62,140

Merrimack	41,408	Strafford..	31,494
Rock'ham.	50,122	Sullivan...	19,041
Total.....			326,072

VERMONT.—Area, 10,212 square miles.

Addison...	24,010	Chitt'nden	28,171	Grand Isle.	4,296
Benningt'n	19,435	Essex	5,786	La Moille..	12,311
Caledonia.	21,708	Franklin..	27,241	Orange....	25,455

Orleans ...	18,982	Windham.	26,983
Rutland ...	35,949	Windsor...	37,195
Wash'ton .	27,614	Total ..	315,116

MASSACHUSETTS.—Area, 7,800 square miles.

Barnstable	35,990	Dukes.....	4,403	Hampden..	57,365
Berkshire .	55,120	Essex....	165,610	Hampshire	37,824
Bristol....	93,795	Franklin..	31,434	Middl'sex	216,351

Nantucket	6,094	Suffolk...	192,701
Norfolk ..	109,950	Worc'ter.	159,660
Plymouth	64,768	Total..	1,231,065

RHODE ISLAND.—Area, 1,306 square miles.

Bristol....	8,907	Kent.....	17,303	Newport..	21,897
Total.....					

Provid'ce.	107,799	Washing'n	18,715
			174,621

CONNECTICUT.—Area, 4,674 square miles.

Fairfield ..	77,476	Litchfield..	47,317	N. Haven.	97,347
Hartford..	89,964	Middlesex.	32,993	N. London.	57,422

Tolland ...	21,187	Windham.	36,445
Total.....			460,151

NEW YORK.—Area, 47,000 square miles.

Albany...	113,919	Dutchess ..	64,939	Livingston	39,546
Alleghany.	41,882	Erie.....	141,973	Madison...	43,586
Broome....	35,910	Essex	28,214	Monroe ..	100,659
Catta'gus..	43,897	Franklin..	30,836	Montgo'ry.	30,867
Cayuga....	55,769	Fulton....	24,162	N. York .	813,668
Chaut'qua.	58,354	Genesee...	32,189	Niagara...	50,399
Chemung..	26,917	Greene....	31,930	Oneida ...	105,201
Chenango..	40,936	Hamilton .	3,024	Onondaga .	90,687
Clinton....	45,736	Herkimer.	40,560	Ontario....	44,566
Columbia .	47,250	Jefferson..	69,828	Orange....	63,814
Cortland..	26,296	Kings....	279,125	Orleans ...	28,717
Delaware..	42,467	Lewis.....	28,581	Oswego....	75,960
Total.....					

Otsego	50,166	Steuben ...	66,689
Putnam ...	14,002	Suffolk	43,276
Queens....	57,391	Sullivan ..	32,385
Rensselaer	86,325	Tioga.....	28,739
Richmond.	25,493	Tompkins.	31,411
Rockland..	22,492	Ulster.....	76,379
St. Law'e .	83,689	Warren ...	21,434
Saratoga ..	51,732	Washing'n	45,909
Schenec'y.	20,002	Wayne....	47,762
Schoharie.	34,469	Westc'ter.	99,457
Schuyler..	18,840	Wyoming.	31,967
Seneca....	28,139	Yates	20,291
			3,880,735

NEW JERSEY.—Area, 3,320 square miles.

Atlantic...	11,786	Cumberl'd.	22,605	Hunterdon	33,654
Bergen....	21,618	Essex.....	98,875	Mercer....	37,411
Burlington	49,730	Gloucester	18,444	Middlesex.	34,810
Camden...	34,457	Hudson....	62,717	Monmouth	39,345
Cape May.	7,130	Total.....			

Morris....	34,679	Somerset..	22,057
Ocean.....	11,176	Sussex....	23,855
Passaic...	29,013	Warren...	28,434
Salem.....	22,458	Union.....	27,781
			672,031

PENNSYLVANIA.—Area, 46,000 square miles.

Adams....	28,012	Centre.....	27,100	Franklin..	42,128
Alleghany	178,835	Chester....	74,578	Fulton	9,131
Armstrong	35,797	Clarion....	24,994	Greene....	24,343
Beaver....	29,144	Clearfield.	18,758	Hunt'gdon	28,101
Bedford....	26,737	Clinton....	17,723	Indiana ...	33,687
Berks	93,819	Columbia..	25,065	Jefferson..	18,269
Blair.....	27,829	Crawford..	48,755	Juniata ...	16,986
Bradford ..	48,735	Cumberl'd.	40,098	Lancaster	116,315
Bucks	63,578	Dauphin ..	46,757	Lawrence .	22,999
Butler.....	35,596	Delaware..	30,597	Lebanon ..	31,831
Cambria ..	29,156	Elk.....	5,915	Lehigh....	43,754
Cameron.. (New		Erie.....	49,431	Luzerne...	90,243
County.)		Fayette....	39,909	Lycoming.	37,398
Carbon....	21,033	Forest.....	898	Total.....	

McKean...	8,859	Snyder....	15,035
Mercer....	36,857	Somerset..	26,784
Mifflin	16,341	Sullivan....	5,637
Monroe....	16,759	Susqueh'a.	36,267
Montgo'ry.	70,500	Tioga	31,045
Montour ...	13,053	Union.....	14,145
North'pton	47,904	Venango ..	25,044
North'l'd..	28,892	Warren ...	19,190
Perry	22,794	Washing'n	46,804
Philad'ia.	565,531	Wayne....	32,279
Pike..... ..	7,155	Westm'l'd	53,736
Potter.....	11,470	Wyoming .	12,540
Schuylkill	89,515	York.....	68,200
			2,906,370

DELAWARE.—Area, 2,120 square miles.

Kent.....	27,801	Newcastle	54,800	Sussex....	29,617

Total....	112,218

MARYLAND.—Area, 11,124 square miles.

Alleghany.28,348	Carroll....24,532	Frederick .46,576	Montgo'ry.18,322	Somerset..24,992
Anne Arun23,083	Cecil.....23,863	Harford...23,415	Prince Geo23,327	Talbot.....14,795
Baltimore266,554	Charles. ..16,517	Howard...13,338	Qu. Anne..15,961	Wash'ton .31,414
Calvert....10,447	Dorchester20,461	Kent.....13,267	St. Mary's 15,124	Worcester 20,661
Caroline ..11,129	Total.....			687,034

DISTRICT OF COLUMBIA.—Area, 60 square miles.

Washington..... 75,076

VIRGINIA.—Area, 61,352 square miles.

Accomack.18,586	Culpepper .12,064	Isle of W't 9,977	New Kent..5,884	Rock'g'm..23,408
Albemarle 26,625	Cumberl'd. 9,961	Jackson... 8,306	Nicholas...4,626	Russell... .10,180
Alexand'ria12,652	Dinwiddie.30,198	Jas. City.. 5,793	Norfolk...36,158	Scott.....12,072
Alleghany. 6,765	Doddridge. 5,203	Jefferson..14,575	North'pton 7,832	Shenand'h 13,896
Amelia....10,753	Eliz. City.. 5,798	Kanawha..16,150	North'land 7,530	Smyth.....8,952
Amherst ..13,743	Essex.....10.469	K'g & Q'n.10,331	Nottoway. 8,836	South'pton12,914
Appomat'x 8,887	Fairfax....11,835	King Geo...6,571	Ohio..... ..22,422	Spottsyl'a.16,076
Augusta...27,750	Fauquier..21,704	King Wm. 8,529	Orange....10,706	Stafford ... 8,555
Barbour....8,959	Fayette.....5,997	Lancaster. 5,151	Page..... 8,109	Surry 6,133
Bath.....3,676	Floyd.....8,236	Lee..... ..11,032	Patrick.... 9,359	Sussex....10,175
Bedford.. .25,068	Fluvanna..10,353	Lewis..... 7,999	Pendleton. 6,165	Taylor.... 7,463
Berkeley...12,523	Franklin..20,098	Logan..... 4,938	Pittsylv'a.32,104	Tazewell.. 9,920
Boone.....4,840	Frederick .16,547	Loudon....21,772	Pleasants . 2,945	Tucker.... 1,428
Botetourt..11,516	Giles..... 6,883	Louisa....16,698	Pocahontas 3,958	Tyler..... 6,517
Braxton....4,992	Gilmer.... 3,759	Luneuburg..11,984	Powhatan. 8,391	Upshur.... 7,292
Brooke.....5,494	Gloucester10,956	McDowell...1,535	Preston ...13,312	Warren... 6,442
Brunswick14,811	Goochland 10,656	Madison....8,854	Pr'ce Ed'd 11,844	Warwick.. 1,740
Buchanan ..2,793	Grayson .. 8,252	Marion....12,721	Pr'ce Geo.. 8,410	Wash'ton .16,893
Buck'ham.15,212	Greenbrier12,210	Marshall...13,001	Pr'ce Wm. 8,565	Wayne.... 6,747
Cabell.....8,020	Greene.... 5,025	Mason.....9,185	Pr'c'ss A'e 7,714	Webster .. 1,555
Calhoun....2,502	Greenville 6,374	Matthews . 7,091	Pulaski ... 5,416	Westm'ld. 8,282
Campbell..26,197	Halifax....26,521	Meckl'b'g .20,096	Putnam... 6,301	Wetzel.... 6,703
Caroline..18,465	Hampsh'r.13,913	Mercer.... 6,818	Raleigh ... 3,367	Wirt 3,751
Carroll.....8,012	Hancock... 4,445	Middlesex. 4,364	Randolph.. 4,990	Wise..... 4,508
Chas. City. 5,609	Hanover...17,225	Monong'a .13,048	Rappah'k.. 8,850	Wood 11,046
Charlotte..14,469	Hardy 9,864	Monroe....10,757	Richmond. 6,856	Wyoming. 2,865
Chesterf'd 19,017	Harrison..13,790	Montgo'ry.10,615	Ritchie.... 6,847	Wythe....12,305
Clarke.... 7,146	Henrico...61,616	Morgan.... 3,731	Roane..... 5,382	York 4,946
Clay..... 1,787	Henry 12,105	Nansem'd.13,693	Roanoke .. 8,048	
Craig..... 3,553	Highland.. 4,319	Nelson....13,015	Rockb'dge.17,250	Total..1,596,079

NORTH CAROLINA.—Area, 50,704 square miles.

Alamance.11,853	Cherokee.. 9,166	Halifax ...19,441	Mec'lenb'g17,374	Rowan....14,586
Alexander. 6,022	Chowan... 6,842	Harnett... 8,039	Montgo'ry. 7,649	Rutherford11,573
Alleghany. 3,590	Cleaveland12,348	Haywood.. 5,801	Moore.....11,427	Sampson...16,623
Anson.....13,664	Columbus. 8,597	Henderson 10,448	Nash.....11,688	Stanly 7,801
Ashe..... 7,956	Craven....16,273	Hertford... 9,504	N. Han'v'r15,430	Stokes 10,402
Beaufort ..14,779	Cumberl'd 16,369	Hyde..... 7,724	North'pt'n13,376	Surry 10,379
Bertie.....14,311	Currituck. 7,416	Iredell....15,347	Onslow.... 8,856	Tyrrel 4,943
Bladen....11,995	Davidson..16,601	Jackson... 5.528	Orange....16,949	Union.....11,202
Brunswick .8,406	Davie 8,494	Johnson...15,657	Pasquotank 8,940	Wake.....28,627
Buncombe.12,654	Duplin....15,786	Jones..... 5,730	Perquimans7,248	Warren...15,726
Burke..... 9,237	Edgecomb.17,376	Lenoir 10,211	Person....11,221	Wash'ton . 6,357
Cabarrus..10,546	Forsyth ...12,691	Lillington. 6,285	Pitt.....16,080	Watauga.. 4,957
Caldwell.. 7,492	Franklin...14,110	Lincoln .. 8,195	Polk..... .. 4,043	Wayne....14,906
Camden... 5,343	Gaston.... 9,310	McDowell. 7,120	Randolph..16,793	Wilkes....14,749
Carteret .. 8,185	Gates 8,444	Macon..... 6,004	Richmond.11,009	Wilson.... 9,720
Caswell...16,215	Granville .23,396	Madison .. 5,908	Robeson...15,490	Yadkin....10,718
Catawba..10,730	Greene.... 7,925	Martin....10,189	Rock'gh'm16,746	Yancey.... 8,655
Chatham ..19,105	Guilford ..20,056	Total.....		992,667

SOUTH CAROLINA.—Area, 29,385 square miles.

Abbeville..32,385	Chesterf'd.11,834	Georgeto'n21,305	Lexington.15,579	Richland ..18,334
Anderson..22,872	Clarendon.13,099	Greenville 21,891	Marion....21,190	Spartanb'g26,920
Barnwell..30,743	Colleton ..30,915	Horry..... 7,964	Marlboro'.12,434	Sumter....23,860
Beaufort..40,052	Darlington20,343	Kershaw...13,169	Newberry.20,879	Union.....19,635
Charleston81,105	Edgefield..39,887	Lancaster.11,797	Orangeb'g.24,896	Wil'msb'g 15,489
Chester...18,123	Fairfield ..22,111	Laurens...23,858	Pickens...19,639	York 21,503
Total.....				703,812

GEORGIA.—Area, 58,000 square miles.

Appling....4,190	Bullock....5,668	Catoosa 5,082	Clayton ... 4,466	Dade..... 3,069
Baker..... 4,985	Burke.....17,165	Charlton ...1,780	Clinch 3,063	Dawson... 3,857
Baldwin....9,078	Butts.....6,455	Chatham...31,043	Cobb.....14,241	Decatur...11,923
Banks 4,707	Calhoun....4,913	Chattooga. 7,165	Coffee..... 2,879	De Kalb... 7,807
Berrien.. ..3,471	Camden 5,420	Chattah'ie .5,806	Colowitt .. 1,316	Dooly..... 8,915
Bibb.. 16,291	Campbell ..8,301	Cherokee ..11,291	Columbia .11,860	Dougherty. 8,295
Brooks.. ...6,356	Carroll....11,991	Clarke.....11,225	Coweta....14,703	Early.. .. 6,158
Bryan..... 4,013	Cass..... ..15,724	Clay..... 4,893	Crawford.. 7,693	Echols.... 1,491

Effingham..4,756	Harris....13,736	Madison... 5,933	Pulaski ... 8,744	Towns 2,459
Elbert.....10,433	Hart..... 7,390	Marion..... 7,197	Putnam...10,130	Troup.....16,259
Emanuel.. 5,081	Heard..... 7,805	Meriwet'r.15,329	Quitman.. 3,499	Twiggs.... 8,320
Fannin.... 5,140	Henry.....10,702	Miller..... 1,791	Rabun 3,271	Union 4,413
Fayette.... 7,047	Houston...15,613	Milton 4,602	Randolph.. 9,571	Upson..... 9,910
Floyd 15,195	Irwin 1,699	Mitchell .. 4,308	Richmond.21,284	Walker ...10,082
Forsyth... 7,749	Jackson...10,605	Monroe....15,953	Schley 4,633	Walton...11,072
Franklin.. 7,393	Jasper 10,743	Montgo'ry. 2,997	Screven 8,274	Ware 2,200
Fulton....14,427	Jefferson..10,219	Morgan..... 9,998	Spalding... 8,699	Warren... 9,820
Gilmer.... 6,722	Johnson... 2,919	Murray.....7,083	Stewart...13,423	Washing'n12,098
Glascock.. 2,437	Jones..... 9,107	Muscogee..16,584	Sumter 9,428	Wayne..... 2,269
Glynn..... 3,889	Laurens... 6,998	Newton ...14,321	Talbot 13,617	Webster... 5,030
Gordon....10,146	Lee..... 7,176	Oglethorp .11,549	Taliaferro. 4,583	White 3,314
Greene....12,649	Liberty.... 8,369	Paulding .. 7,038	Tatnall 4,352	Whitfield .10,047
Gwinnett..12,940	Lincoln.... 5,466	Pickens ... 4,951	Taylor 6,000	Wilcox.....2,115
Habersham 5,966	Lowndes... 5,249	Pierce..... 1,973	Telfair.....2,713	Wilkes....11,420
Hall..... .. 9,366	Lumpkin.. 4,626	Pike..... ..10,086	Terrell.....6,237	Wilkinson .9,376
Hancock...12,044	McIntosh.. 5,546	Polk..... .. 6,295	Thomas...10,767	Worth.....2,763
Haralson.. 3,039	Macon 8,449	Total.....		1,057,329

FLORIDA.—Area, 59,268 square miles.

Alachua....8,234	Escambia...5,768	Jackson...10,199	Marion.... 8,610	Sumter.....1,549
Brevard (St. Lucie) } 246	Franklin ...1,904	Jefferson.. 9,876	Monroe.... 2,912	Suwanee...1,388
	Gadsden....9,396	Lafayette . 2,068	Nassau ... 3,654	Taylor 1,384
Calhoun.....1,446	Hamilton...4,154	Leon..... ..12.335	New River.4,655	Volusia.....1,158
Clay.....1,914	Hernando } 1,200	Levy..... 1,782	Orange.... 987	Wakulla...2,835
Columbia ..4,727	(Benton) }	Liberty.... 1,457	Putnam 2,712	Walton....3,037
Dade..... 83	Hillsboro'..2,981	Madison... 7,779	St. John's..3,039	Washing'n 2,154
Duval.....5,095	Holmes.....1,386	Manatee .. 854	Santa Rosa 5,481	Total....140,439

ALABAMA.—Area, 50,722 square miles.

Autauga ..16,739	Clarke 15,049	Haue'k(dropped)	Marion....11,180	St. Clair...11,012
Baldwin....7,533	Coffee.....9,622	Henry 14,917	Marshall ..11,472	Shelby....12,618
Barbour...30,815	Conecuh ...11,311	Jackson...18,284	Mobile....41,131	Sumter....24,035
Benton(dropped)	Coosa 19,272	Jefferson...11,744	Monroe....15,669	Talladega .23,520
Bibb..... ..11,894	Covington. 6,469	Lauderd'le17,420	Montgo'ry.35,905	Tallapoosa23,827
Blount 10,865	Dale.. 12,227	Lawrence .13,976	Morgan....11,331	Tusc'loosa23,202
Butler.....18,122	Dallas 33,625	Limestone 15,304	Perry 27,727	Walker ... 7,980
Calhoun....21,539	De Kalb...10,705	Lowndes...27,718	Pickens ...22,319	Washing'n 4,669
Chambers..23,214	Fayette.. .12,850	Macon 26,834	Pike..... ..24,436	Wilcox....24,618
Cherokee..18,360	Franklin ..18,628	Madison ..26,450	Randolph..20,059	Winston... 3,576
Choctaw ..18,887	Greene....30,859	Marengo ..31,194	Russell....26,593	Total....964,296

MISSISSIPPI.—Area, 47,156 square miles.

Adams....20,165	Covington. 4,408	Jefferson..15,349	Neshoba.. 8,343	Sunflower. 5,019
Amite.....12,336	De Soto ...23,336	Jones..... 3,323	Newton.... 9,661	Tallah'tc'e 7,892
Attala 14,168	Franklin.. 8,265	Kemper ...11,682	Noxubee...20,666	Tippah....22,550
Bolivar....10,471	Greene.... 2,232	La Fayette16,135	Oktibbeha.12,982	Tishem'go 24,149
Calhoun... 9,518	Hancock... 3,139	Lauderd'le13,313	Panola....13,794	Tunica.... 4,367
Carroll....22,038	Harrison .. 4,819	Lawrence . 9,213	Perry 2,606	Warren...20,710
Chickasaw16,426	Hinds.....31,342	Leake..... 9,324	Pike 11,135	Washing'u15,679
Choctaw...15,740	Holmes ...17,794	Lowndes...23,625	Pontotoc...22,114	Wayne..... 3,691
Claiborne .15,680	Issaquena .. 7,831	Madison ...23,382	Rankin....13,637	Wilkinson15,235
Clarke....10,771	Itawamba.17,695	Marion.... 4,686	Scott 8,140	Winston... 9,811
Coahoma.. 6,606	Jackson... 4,122	Marshall..28,820	Simpson... 6,080	Yallab'sha16,980
Copiah....15,399	Jasper 11,007	Monroe....21,283	Smith..... 7,638	Yazoo.....22,373
	Total.....			791,396

LOUISIANA.—Area, 41,255 square miles.

Ascension 11,485	Carroll 18,053	Jefferson..15,372	Rapides ...25,360	St. Tam'ny 5,406
Assumpt'n15,379	Catahoula.11,652	La Fayette 9,003	Sabine.... 5,828	Tensas....16,080
Avoyelles .13,166	Claiborne .16,846	La Fourc'e14,044	St. Bernard 4,076	Terre Bo'e 12,090
B. Roug.E.16,048	Concordia.13,805	Livingston 4,431	St. Charles.5,297	Union.....10,390
B. Roug.W 7,312	De Soto ...13,299	Madison ..14,133	St. Helena .7,130	Vermillion 4,324
Bienville..11,000	Felic'a, E. 14,696	Morehouse10,357	St. James .11,504	Washita ...4,727
Bossier....12,628	Felic'a,W.11,671	Natchito's16,697	St. J'n Bap.7,932	Washing'n.4,708
Caddo.....12,140	Franklin .. 6,162	Orleans...174,288	St. Landry23,100	Winn.....6,876
Calcasieu.. 5,928	Iberville...14,661	Plaquemine8,493	St. M'tin's12,677	Opelousas.23,104
Caldwell.. 4,833	Jackson... 9,812	P't Coupee17,720	St. Mary's 16,812	Total....709,290

TEXAS.—Area, 237,504 square miles.

Anderson..10,397	Bell..... 4,800	Burleson .. 5,683	Clay..... 109	Culloch (not or.)
Angelica.. 4,271	Bexar.....14,454	Burnett ... 2,488	Colem'n(not or.)	Dallas.....8,665
Archer. (not or.)	Blanco.... 1,281	Calahan(not or.)	Collin..... 9,286	Dawson..... 281
Attacosta.. 1,580	Bosque.... 2,005	Caldwell.. 4,481	Colorado.. 7,885	Denton.....5,030
Austin....10,139	Bowie..... 5,052	Calhoun... 2,642	Comal.....4,020	De Witt....5,107
Bandera... 399	Brazoria.. 7,143	Cameron ...6,030	Comanche.. 709	Dim'itt.(not or.)
Bastrop.... 5,726	Brazos.... 2,776	Cass..... 8,411	Conchos(not or.)	Duval..(not or.)
Baylor..(not or.)	Brown..... 244	Chambers. 1,508	Cook..... ...2,760	Eastland.... 99
Bee..... 910	Buchanan. 230	Cherokee..12,098	Coryell 2,666	Edwar's(not or.)

Ellis.....5,246
El Paso 4,051
Encinal..... 43
Erath.....2,425
Falls.....3,614
Fannin.....9,217
Fayette 11,604
Fort Bend...6,143
Freestone...6,881
Frio..... 40
Galveston..8,177
Gaudalupe..5,444
Gillespie...2,736
Goliad.....3,383
Gonzales...8,050
Grayson....8,187
Grimes....10,307
Hamilton... 489
Hard'an(not or.)
Hardin.... 1,353
Harris.....7,710
Harrison..15,001
Haskell (not or.)
Hays.....2,058
Henderson..4,595
Hidalgo 1,193
Hill.....3,653
Hopkins....7,745
Houston....8,058
Hunt.....6,654
Jack.....1,000
Jackson....2,612
Jasper.....4,041
Jefferson...1,994
Johnson....4,305
Jones...(not or.)
Karnes.....2,171
Kaufman...3,936
Kemble (not or.)
Kerr..... ... 634
Kinney..... 61
Knox.. (not or.)
Lamar 10,136
Lampasas..1,028
La Salle(not or.)
Lavacca....5,948
Leon.....6,781
Liberty.. ..3,189
Limestone..4,537
Live oak.... 593
Llano.....1,101
McLennan .6,206
M'Mul'n(not or.)
Madison....2,238
Marion.....3,979
Mason..... 630
Matagorda..2,910
Maverick .. 728
Medina.....1,838
Menard.(not or.)
Milam.....5,175
Montague... 849
Montg'ry..5,479
Nacogdoc's.8,293
Navarro....5,997
Newton....3,123
Taylor. (not or.)
Nueces.....2,907
Orange.....1,916
Palo Pinto..1,524
Panola.....8,475
Parker.....4,214
Polk.....8,298
Presidio.... 580
Red River..8,534
Refugio.....1,594
Robertson ..4,997
Ru'nells(not or.)
Rusk.....15,808
Sabine 2,750
San Aug'e..4,094
San Patricio 620
San Saba... 913
Shackelford 44
Shelby 5,362
Smith.....13,395
Starr.....2,406
Tarrant... ..6,020
Throckmor'n 124
Titus.....9,648
Travis 8,080
Trinity 4,392
Tyler.. 4,525
Upshur....10,645
Uvalde..... 506
Van Zandt..3,778
Victoria...5,675
Walker....8,191
Washing'n15,215
Webb.....1,446
Wharton...3,380
Wichita(not or.)
Wilb'er (not or.)
Williams'n 4,529
Wise.....3,160
Wood.....4,968
Young..... 592
Za Patta...1,248
Zavalla.... 26
Total....602,432

ARKANSAS.—Area, 52,198 square miles.

Arkansas ..8,844
Ashley.....8,590
Benton.....9,305
Bradley....8,388
Calhoun....4,103
Carroll....9,383
Chicot 9,231
Clark..... ..9,733
Columbia ..2,451
Conway....6,698
Craighead..3,066
Crawford ..7,850
Crittenden..4,919
Dallas.....8,287
Desha 6,458
Drew..... ..9,079
Franklin...7,299
Fulton 4,024
Greene.....5,844
Hempstead13,991
Hot Spring.5,635
Independ'e 14,308
Izard.....7,215
Jackson...10,493
Jefferson ..14,977
Johnson....7,612
La Fayette.8,466
Lawrence..9,349
Madison....7,740
Marion.....6,192
Mississippi.3,895
Monroe 5,657
Montg'ry..3,633
Newton.....3,393
Perry.....2,465
Philips....14,878
Pike.....4,025
Poinsett....3,621
Polk.....4,262
Pope.. 7,867
Prairie.....8,854
Pulaski ...11,700
Randolph...6,261
St. Francis.8,673
Saline.....6,640
Scott.....5,145
Searcy 5,271
Sebastian...9,238
Sevier.....10,516
Union.....12,288
Van Buren..5,357
Washing'n14,673
Washita...12,936
White.....8,316
Yell.....6,333
Total.....435,427

TENNESSEE.—Area, 45,600 square miles.

Anderson...7,068
Bedford....21,584
Benton 8,463
Bledsoe 4,459
Blount 13,272
Bradley ...11,701
Campbell...6,712
Cannon 9,509
Carroll....17,518
Carter.....7,124
Chatham...7,258
Claiborne..9,644
Cocke.....10,408
Coffee.....9,689
Cumberl'nd3,460
Davidson..47,054
Decatur....6,277
De Kalb...10,573
Dickson... ..9,982
Dyer.....10,536
Fayette....24,329
Fentress... 5,054
Franklin...13,848
Gibson....21,783
Giles.....26,166
Granger...10,962
Greene....18,964
Grundy.... 3,094
Hamilton .13,259
Hancock... 7,021
Hardeman 17,769
Hardin.....11,214
Hawkins...16,141
Haywood..19,232
Henderson14,491
Henry 19,133
Hickman.. 9,312
Humphreys 9,100
Jackson ...11,725
Jefferson..16,042
Johnson.. 5,018
Knox.....22,812
Lauderdale 7,562
Lawrence . 9,319
Lewis..... 2,241
Lincoln ...22,828
McMinn...13,553
McNairy...14,732
Macon 7,290
Madison...21,535
Marion.... 6,190
Marshall..14,592
Maury 32,498
Meigs 4,667
Monroe....12,607
Montgo'ry.20,895
Morgan.... 3,353
Obion 12,817
Overton....12,637
Perry 6,042
Polk.. 8,726
Putnam ... 8,558
Rhea..... 4,991
Roane.....13,585
Robertson.15,265
Rutherford27,918
Scott..... 3,519
Sequatchie 2,120
Sevier 9,122
Shelby....48,091
Smith.....16,357
Stewart... 9,888
Sullivan ..13,553
Sumner ...22,030
Tipton.....10,704
Union..... 6,117
Van Buren 2,581
Warren...11,147
Washing'n14,846
Wayne.... 9,115
Weakley..18,216
White 9,381
Will'mson23,827
Wilson....26,072
Total..1,109,847

KENTUCKY.—Area, 37,680 square miles.

Adair 9,509
Allen 9,187
Anderson.. 7,404
Ballard.... 8,693
Barren....16,665
Bath..... ..12,113
Boone.. ...11,197
Bourbon...14,859
Boyd..... ...6,044
Boyle.. 9,305
Bracken...11,021
Breathitt.. 4,980
Breckinr'e 13,237
Bullitt.... 7,289
Butler..... 7,927
Caldwell.. 9,318
Callaway.. 9,915
Campbell..20,909
Carroll.... 6,578
Carter..... 8,516
Casey 6,465
Christian..21,628
Clark.....11,484
Clay..... .. 6,652
Clinton.... 5,781
Crittenden 8,796
Cumberl'd 7,340
Daviess ...15,549
Edmondson 4,647
Estill..... 6,886
Fayette ...22,599
Fleming ..12,488
Floyd..... 6,388
Franklin...12,693
Fulton... .. 5,317
Gallatin... 5,056
Garrard...10,530
Grant 8,356
Graves....16,234
Grayson... 7,982
Green.. ... 8,805
Greenup... 8,759
Hancock.. 6,213
Hardin....15,190
Harlan.... 5,494
Harrison..13,779
Hart.....10,348
Henderson14,262
Henry 11,950
Hickman.. 7,011
Hopkins...11,875
Jackson ... 3,087
Jefferson..89,405
Jessamine. 9,466
Johnson... 5,305
Kenton....25,467
Knox..... 7,707
La Rue.... 6,891
Laurel.... 5,488
Lawrence. 7,601
Letcher ... 3,904
Lewis..... 8,361
Lincoln ...10,646
Livingston 7,202
Logan.....19,021
Lyon..... .. 5,309
McCrack'n10,360
McLean... 6,146
Madison ..17,207
Magoffin .. 3,484
Marion....12,605
Marshall.. 6,984
Mason... ..18,223
Mead..... 8,898
Mercer.... 13,701
Metcalfe .. 6,745
Monroe.... 8,551
Montgo'ry. 7,859
Morgan.... 9,238
Muhlenb'g 10,725
Nelson....15,801
Nicholas...11,030
Ohio..... ...12,208
Oldham ... 7,283
Owen..... ...12,721
Owsley.... 5,335
Pendleton .10,443
Perry 3,950
Pike..... .. 7,384
Powell.... 2,257
Pulaski ...17,203
Rock Castle5,343
Rowan.... 2,282
Russell.... 6,024
Scott.....14,417
Shelby....16,436
Simpson .. 8,116
Spencer ... 6,188
Taylor.... 7,481
Todd.....11,575
Trigg.....11,052
Trimble... 5,880
Union.....12,791
Warren...17,325
Washing'n11,575
Wayne.... 10,258
Webster .. 7,533
Whitley .. 7,762
Woodford .11,229
Total..1,155,713

OHIO.—Area, 39,964 square miles.

Adams....20,309
Allen.....19,185
Ashland...22,951
Ashtabula.31,814
Athens 21,364
Auglaize...17,188
Belmont...36,438
Brown 29,956
Butler.....35,840
Carroll....15,738
Champ'ign22,698
Clark 25,301
Clermont..33,037
Clinton....21,462
Columbi'a.32,836
Coshocton.25,032
Crawford..23,880
Cuyahoga .78,035
Darke.....26,209
Defiance ..11,886
Delaware..23,012
Erie.....24,473
Fairfield ..30,538
Fayette ...15,936
Franklin..50,373
Fulton....14,044
Gallia.....22,015
Geauga....15,817
Greene....26,197
Guernsey..24,474
Hamilton 216,411
Hancock...22,886
Hardin....13,569
Harrison...19,109
Henry 8,901
Highland..27,774
Hocking...17,059
Holmes ...20,589
Huron 29,899
Jackson...17,941
Jefferson..26,417
Knox.....27,735
Lake.....15,576
Lawrence .23,254
Licking ...37,011
Logan.....20,997
Lorain....29,745
Lucas.....25,831
Madison ..13,015
Mahoning .25,895
Marion....15,490
Medina....22,571
Meigs.....26,534
Mercer 14,105
Miami 29,959
Monroe....25,743
Montgo'ry.52,233
Morgan....22,117
Morrow...20,445
Musking'm44,417
Noble.....20,751
Ottawa.... 7,017
Paulding.. 4,945
Perry 19,679
Pickaway.23,469
Pike..... ..13,643
Portage ...24,206
Preble 21,820
Putnam...12,808
Richland ..31,156
Ross 35,071
Sandusky .21,147
Scioto.....24,297
Seneca....30,869
Shelby....17,493
Stark.....42,976
Summit....27,340
Trumbull .30,656
Tuscar'w's32,463
Union.....16,507
Van Wert.10,238
Vinton....13,631
Warren...26,908
Washing'n36,271
Wayne....32,483
Williams .16,632
Wood 17,886
Wyando'te15,596
Total.....2,339,599

MICHIGAN.—Area, 56,243 square miles.

Alcona.... 185
Allegan...16,087
Alpena.... 290
Antrim.... 179
Barry.. ...13,858
Bay..... ... 3,164
Berrien ...22,376
Branch .. .20,981
Calhoun...29,563
Cass..... ...17,721
Cheboygan 517
Chippewa . 1,603
Clare...(not or.)
Clinton....13,916
Crawf'd(not or.)
Delta..... 1,172
Eaton.....16,476
Emmett... 1,149
Genesee...22,498
Gladwin .. 14
GrandTrav.1,286
Gratiot.... 4,042
Hillsdale..26,675
Houghton . 9,235
Huron 3,165
Ingham ...17,435
Ionia.....16,682
Iosco..... 175
Isabella... 1,443
Jackson...26,671
Kal'mazoo24,645
Kalc'ca(not or.)
Kent.....30,715
Lake...(not or.)
Leelenaw.. 2,158
La Peer...14,754
Lenawee..38,112
Livingston16,852
Macomb...22,843
Manistee.. 975
Manitou... 1,012
Marquette. 2,821
Mason 831
Michilim'c 1,938
Midland... 787
Miss'k'e(not or.)
Monroe....21,593
Montcalm. 3,968
Mont'cy(not or.)
Muskeegon 3,947
Necosta... 970
Newaygo.. 2,761
Oakland...38,261
Oceana.... 1,816
Ogem'w(not or.)
Ontonagon. 4,568
Osceola ... 27
Oscoda..(not or.)
Otsego..(not or.)
Ottawa....13,215
Presque Isle 26
Rosc'm'(not or.)
Saginaw ..12,693
St. Clair ..26,602
St. Joseph.21,262
Sanilac.... 7,601
Schiawas'e12,349
Schoolcraft 78
Tuscola ... 4,886
Van Buren15,224
Wash'naw35,688
Wayne....75,548
Wexf'd.(not or.)
Total.....749,112

INDIANA.—Area, 33,809 square miles.

Adams.... 9,574
Allen.....29,327
Bartholo'w17,945
Benton.... 2,810
Blackford.. 4,122
Boone 16,754
Brown 6,507
Carroll....13,489
Cass 16,843
Clarke 20,506
Clay 12,160
Clinton....14,505
Crawford.. 8,205
Daviess...13,361
Dearborn..24,406
Decatur...17,294
De Kalb...13,880
Delaware .15,758
Dubois....10,394
Elkhart....20,991
Fayette ...10,186
Floyd 20,182
Fountain..15,567
Franklin..19,550
Fulton 9,421
Gibson....14,532
Grant.....15,779
Greene....16,042
Hamilton .17,310
Hancock..12,801
Harrison..18,421
Hendricks.16,953
Henry.....20,118
Howard...12,524
Huntingt'n14,868
Jackson...16,288
Jasper 4,292
Jay.....11,399
Jefferson..25,039
Jennings..14,754
Johnson...14,855
Knox.....16,056
Kosciusko.17,428
La Grange.11,365
Lake..... 9,143
La Porte..22,921
Lawrence .13,693
Madison...16,514
Marion....39,858
Marshall ..12,722
Martin.... 8,975
Miami 16,851
Monroe....12,848
Montgo'ry.20,889
Morgan....16,110
Newton ... 2,360
Noble.....14,915
Ohio..... 5,462
Orange....12,076
Owen 14,376
Parke.....15,538
Perry 11,840
Pike 10,079
Porter.....10,314
Posey 16,166
Pulaski ... 5,711
Putnam ...20,681
Randolph..18,997
Ripley 19,053
Rush.....16,192
St. Joseph.18,455
Scott..... 7,304
Shelby....19,571
Spencer ...14,556
Stark..... 2,195
Steuben ...10,374
Sullivan ...15,063
Switzerl'd.12,698
Tippecan'e25,765
Tipton 8,171
Union..... 7,110
Vanderb'g.20,554
Vermillion 9,423
Vigo..... ..22,519
Wabash...17,547
Warren ...10,057
Warrick..13,263
Washing'n17,929
Wayne....29,558
Wells.....10,884
White..... 8,263
Whitley ..10,731
Total.....1,350,941

ILLINOIS.—Area, 55,405 square miles.

Adams....41,323
Alexander. 4,706
Bond..... 9,813
Boone 11,678
Brown 9,938
Bureau....26,429
Calhoun... 5,145
Carroll....11,733
Cass 11,325
Champ'ign14,628
Christian..10,493
Clarke 14,987
Clay 9,336
Clinton....10,941
Coles.....14,200
Cook.....144,957
Crawford..11,551
Cumberl'd 8,311
De Kalb...19,086
De Witt...10,619
Douglas... 7,140
Du Page...14,711
Edgar.....16,925
Edwards.. 5,454
Effingham. 7,816
Fayette ...11,198
Ford..... 1,979
Franklin.. 9,393
Fulton 33,299
Gallatin... 8,054
Greene....16,093
Grundy....10,379
Hamilton . 9,915
Hancock...29,061
Hardin.... 3,748
Henderson 9,501
Henry.....20,658
Iroquois...12,324
Jackson ... 9,589
Jasper..... 8,372
Jefferson..12,965
Jersey 12,053
Jo Daviess27,277
Johnson... 9,342
Kane.....30,058
Kankakee.15,416
Kendall ...13,074
Knox.....28,663
Lake.....18,256
La Salle ..48,332
Lawrence . 9,214
Lee.....17,651
Livingston11,638
Logan.....14,276
McDono'gh20,069
McHenry..22,088
McLean...28,749
Macon 13,735
Macoupin .24,602
Madison ..31,215
Marion....12,733
Marshall ..13,437
Mason.....10,933
Massac.... 6,214
Menard.... 9,596
Mercer....15,042
Monroe....12,832
Montgo'ry.13,892
Morgan....22,113
Moultrie.. 6,385
Ogle.....22,887
Peoria ...36,600
Perry 9,552
Piatt..... 6,127
Pike..... ..27,249
Pope..... 6,742
Pulaski ... 3,950
Putnam... 5,587
Randolph..17,265
Richland .. 9,711
Rock Isl'd21,205
St. Clair..37,694
Saline..... 9,331
Sangamon.32,255
Schuyler...14,685
Scott 9,070
Shelby....14,635
Stark 9,004
Stephens'n25,113
Tazewell...21,471
Union.....11,182
Vermillion19,801
Wabash... 7,312
Warren ...18,336
Washing'n13,371

Wayne....12,233 Whitesid's18,740 Will'mson12,205 Winneb'go24,492 Woodford.13,282
White ....12,403 Will.....29,321 Total.....1,711,753

WISCONSIN.—Area, 53,924 square miles.

Adams.... 6,497 Dane.....43,992 Jefferson ..28,771 Oconto.... 3,600 Shawanan. 8,829
Ashland... 513 Dodge.....42,819 Juneau.... 8,704 Outagamie 9,588 Sheboygan26,848
Bad Ax....11,012 Door..... 2,948 Kenosha ..13,516 Ozaukee...15,674 St. Croix.. 5,393
Brown ....11,797 Douglas... 828 Kewaunee 5,530 Pepin..... 2,397 Trempleau 2,550
Buffalo.... 3,865 Dunn..... 2,723 La Crosse .12,194 Pierce..... 4,672 Walworth.26,506
Burnet.... 12 Eau Claire 3,164 La Fayette18,141 Polk..... .. 1,412 Washing'n23,635
Calumet... 7,896 F'd du Lac34,155 La Pointe . 672 Portage... 7.504 Waukesha 26,849
Chippewa . 1,895 Grant .....31,207 Manit'woc 22,385 Racine....21,340 Waupacca 8,855
Clark ..... 789 Green. ....19,831 Marathon . 2,934 Richland.. 9,737 Waushara. 8,772
Columbia..24,445 Gr'n Lake.12,631 Marquette. 8,236 Rock.....36,692 Winneb'go23,769
Crawford.. 8,071 Iowa .....18,998 Milwaukee62,564 Sauk.....18,894 Wood 2,429
Dallas..... 13 Jackson... 4,171 Monroe.... 8,398 Total.. 775,873

IOWA.—Area, 50,914 square miles.

Adair. .... 984 Clarke.... 5,427 Hamilton . 1,699 Madison .. 7,338 Sac..... 246
Adams.... 1,533 Clay.. .... 52 Hancock.. 179 Mahaska..14,816 Scott.....25,960
Alamakee.12,236 Clayton ...20,728 Hardin.... 5,440 Marion....16,815 Shelby.... 818
Appanoose 11,933 Clinton....18,938 Harrison.. 3,623 Marshall.. 6,015 Sioux..... 10
Audubon... 454 Crawford.. 383 Henry ....18,700 Mills..... 4,480 Story..... 4,052
Benton.... 8,502 Dallas .... 5,244 Howard... 3,163 Mitchell .. 3,409 Tama 5,265
Bl'k Hawk 8,244 Davis .....13,764 Humboldt. 332 Monona ... 832 Taylor.... 3,589
Boone .... 4,231 Decatur... 8,677 Ida..... 43 Monroe.... 8,611 Union..... 2,012
Bremer.... 4,915 Delaware .11,028 Iowa ..... 8,029 Montg'ry. 1,256 Van Buren17,083
Buchanan . 7,906 D's Moines19,612 Jackson...18,494 Muscatine.16,444 Wapello ..14,518
Buena Vista 57 Dickinson. 180 Jasper .... 9,887 Osceola.(not or.) Warren...10,282
Bunc'be (not or.) Dubuque ..31,165 Jefferson..15,037 O'Brien ... 8 Washing'n14,233
Butler..... 3,724 Emmett... 105 Johnson...17,572 Page..... 4,419 Wayne.... 6,411
Calhoun... 147 Fayette ...12,073 Jones .....13,305 Palo Alto.. 133 Webster .. 2,504
Carroll.... 281 Floyd ..... 3,746 Keokuk ...13,284 Plymouth. 148 Winnebago 168
Cass.. .... 1,612 Franklin.. 1,309 Kossuth... 416 Pocahontas 103 Winnesh'k13,942
Cedar .....12,949 Fremont .. 5,074 Lee.....29,232 Polk.....11,625 Woodbury 1,119
Cerro Gordo 940 Green ..... 1,374 Linn .....18,950 Pottawat'e 4,962 Worth..... 756
Cherokee.. 57 Grundy..... 793 Louisa.....10,370 Poweshiek 5,670 Wright.... 653
Chickasaw 4,338 Guthrie ... 3,058 Lucas ..... 5,766 Ringgold.. 2,923 Total...674,948

MINNESOTA.—Area, 95,274 square miles.

Aiken..... 2 Dakotah ... 9,093 Kandiyohi. 76 Nicollet... 3,773 Sherburne. 724
Anoka .... 2,106 Dodge..... 3,797 Lake ..... 248 Noble..... 35 Sibley..... 3,609
Becker.... 386 Douglass.. 195 Le Sueur.. 5,318 Olmstead.. 9,527 Stearns.... 4,505
Benton.... 627 Faribault.. 1,335 Mankahta. Otter Tail.. 240 Steele..... 2,863
Blue Earth 4,802 Fillmore...13,543 Manonin.. 136 Pembina... 1,612 St. Louis.. 406
Breckenridge 79 Freeborn.. 3,367 Martin..... 151 Pierce .... 10 Todd..... 430
Brown .... 2,339 Goodhue .. 8,997 McLeod ... 1,286 Pine ..... 1,741 Toombs... 40
Buchanan. 26 Hennepin..12.849 Meeker.... 928 Pipestone. 23 Wabashaw 7,228
Carleton .. 51 Houston .. 6,645 Mille Lac. 73 Polk..... 240 Wahnata..
Carver.... 5,106 Isanti..... 284 Monongalia 350 Ramsay...12,150 Waseca... 2,601
Cass ..... 160 Itasca..... 51 Morrison.. 618 Renville .. 245 Washing'n 6,123
Chisago ... 91 Jackson... 181 Mower.... 3,217 Rice..... .. 7,543 Winona... 9,208
Cottonwood 12 Kanabac.. 30 Murray... 29 Scott..... 4,594 Wright.... 3,729
Crow Wing 269 Total.....172,022

MISSOURI.—Area, 67,380 square miles.

Adair..... 8,531 Clay.....13.025 Howell.... 3,169 Monroe ...14,785 St. Charles16,525
Andrew...11,850 Clinton.... 7,848 Iron..... 5,842 Montg'ry. 9,719 St. Clair.. 6,809
Atchison.. 4,649 Cole..... 9,696 Jackson...22,914 Morgan.... 8,202 St. Francis 7,248
Audrain... 8,074 Cooper....17,358 Jasper .... 6,883 N. Madrid. 5,653 St. Genev'e8,029
Barry..... 7,704 Crawford.. 5,827 Jefferson...10,344 Newton ... 9,325 St. Louis.190,535
Barton .... 1,817 Dade..... 7,073 Johnson...14,644 Nodoway.. 5,253 Saline.....14,700
Bates..... 7,216 Dallas .... 5,892 Knox..... 8,726 Oregon.... 3,009 Schuyler.. 6,697
Benton.... 9,072 Daviess ... 9,605 La Clede.. 5,180 Osage..... 7,879 Scotland.. 8,873
Bolinger .. 7,388 De Kalb... 5,224 La Fayette20,091 Ozark..... 2,447 Scott... 5,247
Boone.....19,487 Dent..... 5,654 Lawrence. 8,847 Pemiscot.. 2,961 Shannon.. 2,284
Buchanan.23.861 Dodge..... Lewis.....12,286 Perry ..... 9,128 Shelby.... 7,301
Butler..... 2,891 Douglass .. 2,415 Lincoln ...14,214 Pettis ..... 9,492 Stoddard.. 7,877
Caldwell.. 5,034 Dunklin... 5,026 Linn..... 9,112 Phelps.. .. 5,914 Stone..... 2,401
Callaway..17,445 Franklin ..18,083 Livingston 7,417 Pike.. ....18,420 Sullivan .. 9,198
Camden ... 4,975 Gasconade 8,727 McDonald. 4,049 Platte.....18,341 Taney..... 3,576
C. Gir'd'n15,547 Gentry ....11,980 Macon.. ..14,407 Polk.. .... 9,995 Texas..... 6,069
Carroll.... 9,775 Greene....13,186 Madison... 5,664 Pulaski ... 3,843 Vernon.... 4,779
Carter .... 1,234 Grundy.... 7,895 Maries.... 4,901 Putnam... 9,208 Warren... 8,833
Cass.. .... 9,793 Harrison ..10,627 Marion....18,828 Ralls..... 8,592 Washing'n 9,725
Cedar..... 6,639 Henry..... 9,864 Mercer.... 9,300 Randolph..11,406 Wayne.... 5,628
Chariton ..12,569 Hickory... 4,705 Miller..... 6,812 Ray.....14,091 Webster.. 7,099
Christian.. 5,491 Holt.. .. .. 6,550 Mississippi 4,859 Reynolds.. 3,173 Wright.... 4,508
Clark.. ...11,684 Howard...15,949 Moniteau..10,064 Ripley .... 3,747 Total..1,182,317

CALIFORNIA.—Area, 188,981 square miles.

Alameda.. 8,927	Humboldt. 2,694	Nevada ...16,447	San Fran'co56,805	Stanislaus 2,245	
Anador....10,933	Klamath... 1,803	Placer 13,270	San Joaquin9,434	Sutter..... 3,390	
Butte.....12,107	L's Angel's11,336	Plumas.... 4,363	S'n L's Ob'o1,782	Tehama... 4,044	
Calaveras .16,302	Marin..... 3,334	Sacram'to.24,145	San Mateo 3,214	Trinity.... 5,125	
Colusi..... 2,274	Mariposa.. 6,243	St. Barbara 3,543	Shasta.... 4,360	Tulare.... 4,638	
C'tra Costa 5,328	Mendocino 3,967	St. Clara..11,912	Sierra.....11,389	Tuolumne.16,229	
Del Norte. 1,992	Merced.... 1,141	Santa Cruz.4,945	Siskiyou... 7,629	Yolo 4,716	
El Dorado.20,562	Monterey.. 4,739	S. Bernard'o5,554	Solano.... 7,170	Yuba.....13,671	
Fresno.... 4,605	Napa..... 5,515	San Diego..4,326	Sonoma ...11,867	Total ..380,016	

OREGON.—Area, 102,606 square miles.

Benton.....3,074	Coos..... 384	Josephine..1,622	Multnomah 4,150	Wasco 1,689	
Clackamas.3,466	Curry..... 393	Lane 4,780	Polk.....3,625	Washing'n.2,801	
Clatsop 498	Douglas....3,264	Linn 6,772	Tillamook . 95	Yam Hill..3,245	
Columbia .. 532	Jackson 3,736	Marion.....7,088	Umpqua....1,250	Total....52,464	

KANSAS.—Area, 78,418 square miles.

Allen..... 3,082	Clay 163	Godfrey... 19	Lykens.... 4,980	Pottawat'ie 588			
Anderson.. 2,400	Coffey..... 2,842	Greenwood 759	McGee 1,501	Riley..... 1,225			
Atchison.. 7,729	Davis..... 1,163	Hunter.... 158	Marion.... 74	Shawnee.. 3,513			
Bourbon... 6,102	Dickinson. 378	Jackson... 1,936	Marshall.. 2,280	Wabaunsee 1,964			
Breckenr'ge3,832	Doniphan . 8,084	Jefferson.. 4,458	Morris.... 770	Washington 383			
Brown 2,609	Dorn..... 88	Johnson... 4,363	Nemaha .. 2,437	Wilson.... 27			
Butler..... 437	Douglas.. .. 8,637	Leaven'th.12,606	Osage 1,113	Woodson.. 1,488			
Chase..... 808	Franklin.. 3,031	Linn..... 6,336	Otoe.. 238	Wyandot.. 2,609			
		Total.....					107,110

The population of the Territories is rapidly increasing, and no reliable Census Report can be here presented.

Population of the Principal Cities and Towns.

Census of 1860.

Augusta, Me....7,609	Baton Rouge, La.5,428	Danville, Pa....6,385	Haverst'w, N.Y.5,401
Abington, Ms....8,527	Calais, Me 5,621	Dayton, O.....20,482	Hoboken, N. J...9,662
Adams, Ms.....6,924	Concord, N. H..10,896	Detroit, Mich...45,619	Hudson, N. J....7,229
Attleboro', Ms ..6,066	Cambridge, Ms.26,060	Dubuque, Ia....13,012	Hackens'k, N. J.5,488
Albany, N. Y..62,368	Cha'stown, Ms.25,063	Davenport, Ia ..11,268	Harrisburg, Pa.13,406
Auburn, N. Y..10,986	Chelsea, Ms....13,395	Denver, Col.....4,749	Hempfield, Pa...5,450
Arcadia, N. Y.. 5,318	Chicopee, Ms... 7,261	Enfield, Ct.....4,997	Houston, Tex....5,000
Amherst, N Y. 5,089	Cumberl'd, R. I.8,339	Elmira, N. Y ...8,682	Hamilton, O.. ...7,223
Alleghany, Pa..28,703	Cranston, R. I...7,500	Ellisburg, N. Y..5,614	Hannibal, Mo...6,505
Allentown, Pa.. 8,026	Cortland, N. Y.10,075	E. Chester, N.Y.5,582	Ithaca, N. Y....6,843
Alexandria, Va.11,206	Cohoes, N. Y....8,800	Elizabeth, N. J.11,567	India'polis, Ind.18,612
Augusta, Ga....12,493	Canand'g'a,N.Y.7,075	Erie, Pa.....9,419	Iowa City, Ia....5,214
Atlanta, Ga.... 9,554	Castleton, N. Y. 6,778	Easton, Pa.....8,944	Johnstown, N.Y.8,811
Algiers, La..... 5,816	Canton, N. Y....6,379	Evansville, Ind.11,486	Jamaica, N. Y..6,515
Adrian, Mich... 6,213	Catskill, N. Y.. 6,275	Fall River, Ms.14,027	JerseyCity,N.J.29,226
Alton, Ill 6,333	Corning, N. Y...6,003	Fitchburg, Ms...7,805	Jacksonv'le, Fla.2,128
Aurora, Ill..... 6,011	Champlain,N.Y.5,857	Flushing, N. Y.10,189	Jefferson, La....5,107
Atchison, Kan.. 2,616	Camden, N. J...14,358	Fishkill, N. Y.. 9,546	Janesville, Wis.7,703
Bangor, Me.....16,407	Carlisle, Pa.... 5,664	Frederick, Md...8,143	Jeff'son City. Mo.2,500
Biddeford, Me.. 9,349	Carbondale, Pa. 5,575	Frostburg, Md...6,286	Key West, Fla...2,832
Bath, Me..... 8,076	Chambersb'g,Pa.5,257	Freder'ksb'g,Va.5,022	Kingston. N. Y.16,640
Belfast, Me..... 5,520	Columbia, Pa...5,007	F't Wayne,Ind.10,388	Kal'mazoo,Mich.6,070
Burlington, Vt.. 7,713	Cumberl'nd, Md.8,478	F'd du Lac, Wis.5,450	Keokuk, Ia.....8,137
Boston, Ms....177,481	Charleston,S.C.51,210	Fort Smith, Ark.1,529	Lawrence, Kan..1,645
Beverly, Ms... .. 6,154	Columbia, S. C..8,083	Gloucester, Ms .10,903	Leavenw'h, Kan.7,429
Blackstone, Ms. 5,453	Columbus, Ga...9,621	Greenwich, Ct...6,522	Lexington, Mo...4,115
Brookline, Ms .. 5,164	Columbus, Miss.3,308	Greenbush, N.Y.8,929	Lowell, Ms.....36,827
Barnstable, Ms. 5,129	Camden, Ark....1,343	Galen, N. Y.....5,340	Lynn, Ms..... ..19,083
Bristol, R. I.... 5,271	Covington, Ky..16,471	Georgetown,D.C.8,733	Lawrence, Ms...17,639
Bridgeport, Ct..13,299	Cincinnati, O..161,044	Galveston, Tex..8,177	Lockport, N. Y.13,523
Br'klyn, N. Y.266,664	Cleveland, O...36,054	G'd Rapids,Mich.8,058	Lenox, N. Y 8,024
Buffalo, N. Y...81,131	Columbus, O....18,555	Galena, Ill.....8,196	Little F'lls, N.Y.5,989
B'khaven, N. Y.9,923	Chilicothe, O... 7,657	Galesburg, Ill...5,626	Lisbon, N. Y....5,640
Bingh'mt'n,N.Y.8,326	Chicago, Ill...109,263	Golden City, Col.1,014	Lansingb'g, N.Y.5,577
Barre, N. Y.....7,227	Carson City, Nev..708	G't Salt La. City.8,216	Lyons, N. Y.....5,077
Bath, N. Y.....5,127	Dover, N. H 8,502	Haverhill, Ms...9,995	Lancaster, Pa...17,603
Bergen, N. J....7,429	Dorchester, Ms..9,769	Holyoke, Ms.....4,997	Lynchburg, Va..6,853
Burlington, N. J.5,174	Dedham, Ms....6,330	Hartford, Ct....29,152	Little Rock, Ark.3,727
Birmingham, Pa.6,046	Danvers, Ms....5,110	Hempst'd, N.Y.12,375	Louisville, Ky..69,740
Baltimore, Md.212,419	Danbury, Ct 7,234	Hunt'gton, N. Y.8,925	Lexington, Ky...9,321
Bloomington, Ill.7,076	Derby, Ct..... ...5,444	Hudson, N. Y...7,262	Lafayette, Ind...9,426
Burlington, Ia...6,706	Deer Park, N. Y.5,186	Hector, N. Y....5,623	La Porte, Ind....5,028

M'chester,N.H.20,107
Milford, Ms.....9,132
Marblehead, Ms.7,646
Marlboro', Ms...5,911
Malden, Ms.....5,865
Meriden, Ct.....7,426
Morrisania,N.Y.9,245
Malone, N. Y....6,565
Middleto'n, N.Y.6,243
Manlius, N. Y.. 6,028
Milton, N. Y....5,255
Macon, Ga.. 8,247
Mobile, Ala....29,259
Montgo'ry, Ala.. 9,889
Madison, Ind....8,133
Milw'kee, Wis.45,254
Madison, Wis...6,611
Muscatine, Ia...5,324
Minneap's,Minn.2,564
Mesilla, N. Mex.2,406
Memphis, Tenn.22,625
Nashua, N. H..10,065
New Bedf'd,Ms.22,300
Newb'ryp't,Ms.13,401
Newton, Ms.....8,382
North'pton, Ms..6,788
N. Bridgew'r,Ms 6,584
Natick, Ms.....5,515
N.Provid'e,R.I.11,818
Newport, R. I..10,508
New Haven, Ct.39,268
Norwich, Ct....14,027
N. London, Ct..10,115
Norwalk, Ct.....7,582
New Britain, Ct.5,212
N. York, N.Y.813,668
Newburg, N.Y.15,198
Newtown, N.Y.13,725
Niagara, N. Y...6,603
N.Hemps'd,N Y.5,419
Newark, N. J..71,941
N.Bruns'k,N.J.11,255
Norfolk, Va....14,609
Newbern, N. C..5,434
Natchez, Miss..13,553
N.Orleans, La.168,472
Nashville, Ten.16,987
Newport, Ky...10,046
N. Albany, Ind.12,647
Nebraska City..1,912
Oswego, N. Y...16,817
Oyster Bay,N.Y.9,168
Ogdensb'g, N. Y.7,410
Or'getown, N. Y.7,060
Onondaga, N. Y.5,113
Orange, N. J....8,877
Oshkosh, Wis...6,086
Oregon City, Or. ——
Ogden, Utah.... 1,464
Omaha, Neb....1,888
Pembina, Dak...3,556
Pt.To'ns'd,W.Ter.264
Portland, Or....1,371
Portland, Me...26,342
Portsm'th, N. H.9,335
Pittsfield, Ms....8,045
Plymouth, Ms...6,272
Providence,R.I.50,666
Pokeepsie,N. Y.14,726
Parishv'le, N.Y.9,033
Potsdam, N. Y..6,737
Plattsburg, N.Y.6,680
Phelps, N. Y....5,586
Paterson, N.J..19,588
Philad'phia,Pa565,531
Pittsburg, Pa ..49,220
Pottsville, Pa ...9,444
Petersburg, Va.18,266
Portsmouth,Va..9,487
Pensacola, Fla..4,680
Prattville, Ala...3,200
Portsmouth, O..6,268
Peoria, Ill.....14,425
Quincy, Ms.....6,778
Queensb'g, N.Y.7,146
Quincy, Ill.....13,718
Rockland, Me....7,316
Rutland, Vt.....7,577
Roxbury, Ms...25,137
Randolph, Ms.. .5,760
Richmond, Ind..6,603
Rockford, Ill....7,363
Rock Island,Ill..5,130
Racine, Wis....7,822
Saco, Me.....6,223
Salem, Ms.....22,252
Springfield, Ms.15,199
Somerville, Ms..8,025
S. Danvers, Ms..6,549
Smithfield,R.I..13,283
Stonington, Ct.. 7,740
Stamford, Ct....7,185
Syracuse, N. Y.28,199
Sche'ctady,N.Y.9,579
Saugerties, N.Y.9,536
Seneca, N. Y....8,448
Saratoga, N. Y..6,521
Southhold, N. Y.5,833
Sullivan, N. Y. .5,233
Scranton, Pa....9,223
Staunton, Va...14,124
Savannah, Ga...22,292
S. Antonio, Tex.8,274
Sandusky, O....8,408
Springfield, O...7,202
Steubenville, O..6,154
Springfield, Ill..6,499
St. Louis, Mo..151,780
St. Joseph, Mo..8,932
St. Paul, Minn.10,401
St.Anth'y, Minn.3,258
S.Franc'co,Cal.56,805
Sacramento, do.13,788
Salem, Or.....
SantaFe,N.Mex.4,635
Taunton, Ms... 15,376
Troy, N. Y.....39,235
Trenton, N. J..17,221
Tuscaloosa, Ala.3,989
Toledo, O.... ..13,768
Terre Haute,Ind.8,594
Utica, N. Y....22,528
Volney, N. Y.. .8,045
Verona, N. Y...5,966
Vicksburg, Miss.4,591
Virg. City, Nev.2,345
Westbrook, Me..5,113
Worcester, Ms. 24,960
Weymouth, Ms..7,742
Woburn, Ms....6,778
Waltham, Ms...6,397
W.Roxbury, Ms.6,310
Westfield, Ms...5,054
Warwick, R. I.. 8,916
Waterbury, Ct. 10,004
West Troy,N.Y.8,820
Waterto'n, N.Y.7,572
Walkill, N. Y.. 6,603
Wilm'gton,Del.21,258
Washi'g'n,D.C.61,118
Wheel'g,W.Va.14,183
Waynesb'o',Va.13,626
Wilm'gton, N.C.9,553
Wat'rtown,Wis.5,302
Yonkers, N. Y.11,848
York, Pa.....8,605
Zanesville, O....9,229

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NEW-YORK AND WASHINGTON.

THERE are perhaps no two cities in this country to which inventors and patentees are more frequently called, in the course of business, than New-York and Washington. For the convenience of our inventive friends, we subjoin a list of the principal objects and places of interest, which they should endeavor to see whenever they visit either place. Inventors will always be welcome at our offices in New-York or Washington; and we hope they will "walk in" without knocking. We shall be happy to give them any information. (See page 13.)

WASHINGTON.—PLACES OF INTEREST.

Arsenal.
Alexandria, Va.
Aqueduct.
Battle-Fields of Bull Run.
Congressional Cemetery.
Capitol and Grounds.
Georgetown Heights.
General Post-Office.
Government Insane Asylum.
Government Green-Houses.
Jackson's Statue.
Long Bridge.
Mount Vernon.
National Observatory
Navy Yard.
Navy Department.
Potomac Falls.
Presidential Mansion and Gardens.
Patent Office.
Scientific American Office.
Smithsonian Institute.
Soldier's Home.
Treasury Department.
War Department.
Washington Monument.
Washington's Statues.

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Academy of Music.
Academy of Design.
Asylum for the Blind.
Astor Library.
Atlantic Docks.
Battery.
Bible House.
Blackwell's Island.
Central Park.
City Hall.
Cooper Institute.
Croton Reservoir.
Dry Dock.
Fort Hamilton.
Fort Lafayette.
Governor's Island.
Greenwood Cemetery.
High Bridge.
Hoboken.
Navy Yard.
Post-Office.
Scientific American Office.
Sub-Treasury.
South Street.
Staten Island.
Tombs.
Trinity Church.
United States Custom House.
Washington Monument.
Worth Monument.
Wall Street.
Washington Market.

GENERAL INDEX.

Alcohol, force of, . . 35
Amendments, . . 10
Appeals, . 10, 24, 69, 72, 74, 80
Application for Patents, 5, 9, 77
Arsenic, ... 34
Assignments. 7, 29, 30, 31, 32, 65
Assignees, Rights of, 26, 29 30, 32
Austrian Patents, . . . 41
Belgian Patents, ... 41
Bishop, Hon. W. D., letter, 18
British Patents, ... 41
Caveats, ... 8, 33, 59
Census of the U. S., . . 99
Charcoal, Properties of, . 82
Chemical Inventions, . . 51
Circle, Problems, . . 44
Commissioners, Letters of, . 18
Contested Cases, . . 69
Copies of Patents, . . 15, 54
Copyrights, ... 14
Cost of applying for Patents, 9
Courts, Powers of, . . 62
Cuban Patents, ... 41
Designs, ... 14, 76
Disclaimers, . . . 27, 65
Drawings, ... 22, 65
Electric Spark, ... 19
Electric Conductors, . 46
Examinations, . . 6, 23, 56
Examiners-in-Chief, . . 74
Extension of Patents, 28, 63, 71
Fees, Official, Table of, . 76
Forfeited Cases, . . 10, 80
Foreign Patents, . 29, 40
French Patents, . . . 41
General Information, . 7, 33
Going to Washington, . . 15
Geometry, Practical, . 83
Heat Conductors. . . . 50
Heat, Effects of, Table, . 20
Heirs of Inventor, Rights of, 58
Hints to Letter-Writers, . 38, 52
Holt, Hon. J., Letter, . . 18
Horse Power, . . . 49
How to Invent, . . . 3
How to Obtain Patents, . 5, 9
How to Sell Patents . . 42
Income from Patents, . 44
Information, Official, . - 33
Infringements, . . . 16, 97
Interferences, . . 25, 57
Invention, What it is, . 21
Inventor, Rights of, . 13, 29
Mechanical Movements, . 85
Multum in Parvo, . . 91
New-York Places of Interest, 107
Novelty of Inventions, . . 34
Oath, to Patents, . 22, 67, 70
Official Rules, Patent Office, . 21
Ownership in Patents. . 9
Partnership in Inventions, . 9
Patent Laws of the U. S., . 53
Patent Office, Rules, . . 21
Patent Reports, yearly, . 80
Patents, How to Obtain, 5, 9, 13
Patents, How to Sell, . 42
Patents, Value of, . . 4
Patents, Validity of, . . 66
Patents on Small Things, . 45
Patents to Foreigners, . 50
Patents may be Divided, 26, 65
Patentee, Rights of, . . 30
Penalty for Stamping, . 70
Population of Towns and Cities, 105
Power of Water, . . 49
Principle, Claims for, . . 22
Priority of Invention, 21, 25, 57
Prussian Patents, . . . 41
Quick Applications, . . 13
Reissues, . . 26, 59, 66
Rejected Applications, 10, 33, 75
Remittances, ... 11
Royalty, ... 44
Rules, Patent Office, . . 21
Russian Patents, . . 41
Secret Archives, . . . 24
Sound, ... 20
Spanish Patents, . . . 41
Specification, the, . 22, 33
Stamps, on Assignments, etc., 32
Steam Engine, the . . 37
Steam, Pressure of, Table, 98
Substitute for Belts and Gears, 98
Substitute for the Crank, . 82
Suits, Law Patents, . . 60
Tracing Paper, . . . 35
Use, Prior to Patent, . . 68
Useful Hints, . . . 52
Value of Patents, . . 4
Vane, a Sparkling, . . 46
Washington, Places of Interest, 107
What is it Worth, . . 97
What Prevents a Patent . 21
Where to go for Patents, . 81
Who may obtain Patents, . 55
Will it pay, ... 97

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